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ABSTRACT

This collection of 15 essays, reports, and notes written by staff members of the Royal Institute of Technology Library (RITL) addresses various aspects of modern librarianship, and outlines some of the RITL contributions to the field. Designed to present a composite picture of the various activities of RITL since about mid-1973, these essays describe the following: Information Services to Industry--The Role of the Technological University Library; Cataloguing at RITL; The Archives of RITL; Library Use and Users; Non-Satisfied Requests; The RITL Information and Documentation Centre--Decentralization and Systems Development; LIST TECH--A Union List of Periodicals in Science and Technology; A Bibliographic Data Base in Mechanical Engineering; The Use of an Intelligent Terminal as Minicomputer in Library Management; 3RIP--An Interactive Search and Editing System for Large Textual Data Bases; Implementation of a New Interactive On-Line Information Retrieval System--3RIP; A Perspective of Library Education--Experiences from RITL; Introducing Modern Information Services to Research and Development in Portugal; and History of Ideas in Science and Engineering Arts. Lists of reports published by the library, foreign visitors, research projects, and educational and promotional activities are appended. (JPF)

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LIBRARY SERVICES IN TRANSITION

A Presentation of Current Activities at the Royal Institute of Technology Library

Edited by
Stephan Schwarz, Gunnar Carlsson
and Gudmund Fröberg

U.S. DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC) AND USERS OF THE ERIC SYSTEM."

STOCKHOLM
ROYAL INSTITUTE OF TECHNOLOGY LIBRARY
1978

IR006 338

EDITORS´ PREFACE

Research libraries are not generally regarded as centres of innovation and development, although they may handle literature dealing with such matters. Rather, they are found to conform rigidly to conventions and traditions, for the better and worse. The contribution by Gutenberg in the 15th century, the growth of scientific periodicals in the 17th century and the advent of abstract journals and other secondary literature in the 19th century gauge the time scale of important events in library innovation. However, science and technology have grown really big only in the last half-century or so, and we are now witnessing how computer and telecommunications technology are rapidly expanding into the "Gutenberg galaxy" of traditional librarianship.

The Royal Institute of Technology Library has for a long time moved in the forefront of such developments, pursuing large-scale pilot projects on SDI-services (Selective Dissemination of Information) already in the 60´s. Now a spectrum of regular current awareness and retrospective documentation services are offered in areas far beyond science and technology. Advanced systems of computer-aided management of library routines have been developed and are now being implemented in a number of different places in Sweden. Active contributions have been made to sustain a Swedish library network. Educational programs in computer-based library and documentation methods have been created and implemented. In the later years growing interest from a number of countries has resulted in extensive projects of international co-operation in the development of libraries and documentation services.

This volume is the result of an effort to present a picture of a dynamic period in the life of a modern research library, starting about mid-1973. In a series of essays, written by members of RITL staff, various aspects of these developments are outlined. The concluding section is a compilation of data designed to render a fair account of the hectic but stimulating atmosphere as we encounter it in our quotidian activities.

The editorial work has been divided so that one of us (SS) is responsible for the essays while the other two (GC and GF) are responsible for the compilation. We wish to thank all authors for their contributions to the volume. In particular we wish to express our sincere appreciation of the skilful and patient work done by Berit Lundberg, Elsmari Englund and Anette Leopold, who have produced innumerable versions of the different papers and the final camera-ready manuscript.

Stockholm in April 1978

Stephan Schwarz　　Gunnar Carlsson　　Gudmund Fröberg

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INTRODUCTION AND SUMMARY

by Stephan Schwarz

Background

There are many reasons why it is today particularly adequate to speak of a period of transition for the management of research libraries and for the services offered by them. One is due to the changing objectives of higher education as implied by the recent "reformation" of the Swedish university system. Another reason is to be found in the growing importance of studies and applied research in all kinds of areas outside the university, both in the private and the public sector of society. Such changes bring about new requirements of information and library services, covering a growing part of a growing world scientific literature.

The predicament of insufficient resources to satisfy the requirements of the local user community is of course not a novel phenomenon. Union catalogues of periodicals in numerous areas compiled on a regional or national scale, and likewise acquisition catalogues of monographic literature, have been published as instruments for maintaining "abstract" networks of co-operating libraries, thereby creating a shared pool of accessible publications.

However, the manual centralized operation of such devices is practically no longer feasible in most areas, and the sheer size of the scientific system, its structure and dynamics now call for a "qualitatively" new approach that would make it possible to cope, without a prohibitive increase in costs, with all the main requirements of today´s user community. The developments of computer and communication technology have recently reached a point where it is possible to design functional and economically justifiable systems for library and information management and services, and also to build physical networks making such systems widely accessible. Certainly the present level of understanding has not been reached without a large amount of hard labour, ingenuity - and disappointment. This, however, is not surprising with consideration to the complexity of the material to be processed and the operations to be performed.

At least we can now, with reasonable confidence, set goals for the use of computers in libraries, and tell (in outlines) how to attain them and (roughly) at what cost. This does by no means exclude the need for continued efforts in developing new techniques as they come within reach through new results in computer and telcommunications technology. On the other hand we have to watch out so that all these innovations remain what they are meant to be: auxiliary tools for efficient library and information services.

The Royal Institute of Technology Library (RITL) has had the advantage of being responsible for services in the areas of Science and Technology, where the use of computers for information services emerged on the international scene. Computer-based STI/SS (Scientific and Technical Information Systems and Services) began to come to prominence in the mid-sixties, partly as by-products of abstract journals printed by new (computer-controlled) techniques. The OECD was taking a lead in promoting concerted efforts on STI/SS in the member countries, and as a response SINFDOK (the Swedish Council for Scientific and Technical Information and Documentation) was set up in 1968. Already in October 1967 (through the Swedish Technical Research Council) and later through

SINFDOK it became possible for RITL to obtain funds for a long-term R&D project on designing, developing and implementing computerized I&D services for research and industry.

In parallel, RITL participated actively from an early stage in the development of LIBRIS, a national library system based on a central bibliographic data file accessible on-line from participating libraries. Progress on this project has been somewhat behind schedule, due to a series of different factors, among which is a serious underestimation of the costs involved. However, the efforts have given a vast amount of experience in the management of a sophisticated R&D project in the library area, based on co-operation on the national level between experts representing many areas of librarianship and of systems design and software development. A reasonably coherent diagnosis of the "malaise" has been found, and hence it has become possible to reconstruct the project aiming at a transition into a new generation of a national library system, which can incorporate important advances made in various places in the past.

RITL staff have contributed in different ways to these processes either directly, or indirectly through their interaction with and impact on the more traditional library activities. In the present collection of essays, reports and notes, a series of different aspects of modern librarianship are discussed, and some of the RITL contributions are outlined. Some of this material has, although written for the present volume, been released for publication in recent issues of *Scandinavian Journal of Documentation.* The introductory essay was originally published in *Journal of Documentation* and is reproduced here by permission from the publisher. In an appendix a compilation of RITL publications, events and activities is presented as reference tool for the three-year period July 1973 - June 1976. The papers presented here sometimes extend into the following academic years, but on the whole the volume is designed to be something of a triennial progress report, although in a non-conventional form and with an ambition to be of some interest to a wide audience.

A brief survey of contents

One main thesis of the introductory essay may be construed as a Leitmotiv for most development work at RITL. It may be briefly stated as follows: Responsible agency is associated with certain requirements with regard to identifying and taking into account background knowledge/ information that is *in principle* available. The growth of the research system and of scientific literature makes it increasingly difficult to meet such requirements in research or research-based decision-making problems. Computerized information systems and services are designed to facilitate the information retrieval part of this process. The mere existence of such systems and services thus raises the level of requirements on foundations of responsible agency in research and research-based decision-making.

On the other hand, research libraries have to supply the means for potential users to live up to this increased level of responsibility. The second thesis of the introductory essay is that the technical university library does serve as an information centre, but only as a node in a network of STI/SS (Scientific and Technical Information System and Services) and of libraries that cooperate in offering access to the literature. This view is illustrated by numerous examples mainly from the Scandinavian scene.

- The discussion of cataloguing at RITL deals with problems of automation (i.e. the lengthy and laborious process of getting the LIBRIS system off the ground), the introduction of new cataloguing rules (Swedish version of Anglo-American Cataloguing Rules), and the transfer of classification to the Dewey system. This article is supplemented by a note on the RITL archives, which date back to the origin of RIT in 1827. For the anniversary in 1977, a complete catalogue of these archives was produced, thereby also preparing the ground for a more systematic continuation of the collection of historically interesting materials.

- Two papers deal with activities in the loans department. The first one is essentially a report on loans statistics and the growth of copying services. In addition, the impact of computerized documentation services on loans requests is discussed, showing a considerable increase which, although laudable, has not resulted in any allowances for additional staff.

- The second of these articles deals with non-satisfied requests, where three main observations are made: a) Many requests remain non-satisfied because bibliographic indications are insufficient for identification; b) The coverage in the library network of monographic literature is less comprehensive than that of periodicals, in particular when BLLD services are included. Also, there is often an unsatisfactory delay for recent books to become available in the library system, due to delays in delivery and cataloguing; c) Computer-based documentation services give rise to many requests for obviously peripheral literature which may be difficult to obtain. Although the potential value is hard to ascertain, the free library service is bound to create demands that would not be upheld if the marginal cost were to be charged to the customer.

- The RITL information and documentation centre is presented in the following paper. A number of main objectives are discerned: a) Developing systems (and links to other systems) for computer-based information services; b) Organizing, evaluating and improving such systems and services; and c) Training information officers and end-users for an efficient use of available services.

  Developments over the past decade (1967-1977) are described from a functional and economic point of view. Two major trends are apparent, *viz.* towards decentralization of current awareness services and towards increased use of networks for direct access to data bases for interactive search. A section of the paper is devoted to a description of software developments at RITL, showing how the state-of-the-art was gradually improved and refined to make a transition to the decentralized mode of operation possible.

- Union lists of periodicals present a powerful instrument for libraries in their efforts to cover the periodical literature. LIST TECH, edited and published by the RITL since 1948, covers the physical sciences and most areas of technology. It now lists about 11.000 titles available in Swedish public and industrial research libraries. The file was converted in 1970 to machine-readable form and subsequently printed by a computer-controlled photocomposition technique. Material for updating the file is solicited regularly from the participating (c:a 270) libraries, who receive a selective computer printout of the material labelled with their individual signum.

  In 1974 the updating procedure was converted from operations via punched tape input to off-line processing on an intelligent terminal. Thereby corrections, limited exactly to the fields to be modified in each record to be modified, additions and deletions can be stored on a diskette. The material is then conveniently transferred to the computing centre for updating operations on the main file. Hard copy editions of the file are published about every 1 1/2 year, and it is now possible to produce, at low cost, interim versions on a single COM-fiche.

- A bibliographic data base in Mechanical Engineering is produced at RITL as a contribution to improved services to Swedish industry. About 200 journals in appropriate fields and not otherwise covered by existing tape services are regularly scanned for articles, technical notes and products announcements. About 45.000 entries are recorded annually. The production of this data base is briefly described and its utilization analyzed.

- The following article gives an account of recent efforts in using an intelligent terminal as a mini-computer in library management. The terminal was supplied as an instrument for operations in the experimental phase of the LIBRIS project. It was soon realized that these operations could to some extent (as in the case of cataloguing) be performed off-line. To make this possible the original LIBRIS control program was modified and extended. Further, a set of other programs was developed to open up the equipment for numerous applications in library management. These programs are now used currently e.g. for acquisition routines, for work on bibliographies and for a number of purposes where selective output or up-to-date registers are needed. An important application of the latter kind concerns the maintenance of the file from which the union list of periodicals in technological fields, LIST TECH, is produced.

- A major R&D program has been devoted to the development of an interactive search and editing system for large textual data bases. It is conceived in terms of two integrated sub-systems: a text-oriented retrieval system for large files (up to 4 million records), and a flexible text-editing system. The retrieval system can be used for simultaneous searching of several files. Thus a user may search public files of bibliographic or other textual data, and at the same time have access to his own (protected) working files. The overall costs of the system are claimed to be considerably lower than those of established dialogue systems, which makes it competitive for a large variety of applications.

- Implementation of this information search and editing system has been initiated. The following paper first analyses the different features generally desirable for interactive search systems on the basis of several years' experience in the use of other commercially available search systems. Then the 3RIP retrieval system is briefly presented and the different facilities available to the user are described and illustrated. Simultaneous searching in several files, scanning and selection of word stems with different prefixes (left truncation), possible storing of previous searches to be used as part of later searches are features of this new system which are not now generally available in other system. Renaming and storing of search commands is also a specific facility of 3RIP which should facilitate ready access to the system for any user familiar with some other system. As a first application the command languages of both Dialog and Orbit have been "simulated". The bibliographic data base in mechanical engineering produced at the RITL will be the first bibliographic file to be loaded onto the system and thereby made available for interactive searching to the scandinavian user community.

- The next paper discribes recent educational programs developed at RITL. These programs are concerned both with computerized I&D services and with library utilization. Target groups are professional end-users, intermediaries (library staff, information officers), students (including post-graduates), and trainees e.g. from library schools and from institutions abroad. The overall objective, to qualify participants for an efficient use of existing services and information sources, has to be analyzed and specified differently for the different groups. An account is given of a variety of practical experiences.

- The penultimate paper describes a joint program, carried out in co-operation with Portugese authorities, with the aim of introducing modern methods for information services to research and development in Portugal. A centre for scientific documentation was set up in Lisbon, charged with the implementation of a number of activities, to a large extent modelled on experiences from RITL. Several information officers have been trained in Stockholm and RITL staff have participated in educational programs in Portugal. A long-term plan for continued co-operation has been worked out. In the initial stage of operations, current awareness services at RITL will be provided for users in Portugal. A connection to the ESA/RECON system has been established via the node in Paris. An evaluation of the entire program will follow at the end of a test period.

On the progress made in the first year of co-operation, RITL has been invited to carry out (in July 1977) an explorative study concerning the possibilities of a program in Tanzania, with similar ambitions, albeit modified to suit the different conditions.

- Finally, a brief description is given of activities in the history of ideas in science and engineering arts. This is an area that, as yet, is not established at the RIT. There are, however, a number of lectures presented every year, and a couple of students annually choose this area for their diploma work. The library has, since its origin in 1826, an impressive collection of old books in science and technology, and it seems natural to place an institute within the premises of the library. Education in the historical aspects of technology form an interesting complement to programs concerned with the relations of technology and society, futures studies and long range planning which are developed today in many technological universities, including RIT, to widen the perspective of the professional education of engineers.

INFORMATION SERVICES TO INDUSTRY: THE ROLE OF THE TECHNOLOGICAL UNIVERSITY LIBRARY

by Stephan Schwarz*

I. Summary

It seems possible to claim that the Technological University Library (TUL) does not by itself serve as an information centre vis-à-vis the industrial user community. It operates by being part of a network of Scientific and Technical Information Systems and Services (STI/SS), and what appears to the user as a centre is in fact a network node. The process of disclosing information needs is made possible partly by the availability of extensive secondary sources. Some of these form the basis of computer-aided services, preferably associated with the TUL. Present trends towards decentralization of access to bibliographic data files do not contradict the continued importance of the filemanaging documentation centre in maintaining efficient and reliable utilization of available resources. The TUL´s function of giving access to literature is based on supply from a library network system which effectively becomes a shared pool. There are important information services which for practical or financial reasons at present can not, or need not, be associated with a TUL even in a secondary sense.

As to developments it should be noted that changes in the management of STI/SS may have counter-productive effects if a broad enough systems view is not taken in policy formation and planning. This concerns for example the financial support of various activities which cannot easily be made cost-effective in a narrow sense.

The emergence of STI/SS is associated with important questions of professional ethics that seem to receive too little attention. The principal problem concerns the distribution of responsibilities for the selection, evaluation and use of available information, and the determination of a proper level of pre-decisional inquiry demanded for rational action.

Research on potential needs for new services and education on functional use of available STI/SS emerge as vital issues. Education concerns both the user and the custodian of information resources. It comprises among its objectives an active appreciation of the ethical content in the phenomenon of STI/SS, its meaning and implications for professional conduct.

II. Introduction

One of the most cherished myths among laymen and some professionals, even in the library and information area, is that of an "information explosion". This dramatic metaphor carries ominous connotations and is obviously conceived to describe the system of research and technology as going out of control, something like the sorcerer´s disciple in Goethe´s poem. The concept of an information explosion is as mistaken as it is dangerous - or rather counter-productive, to use a modern term. It can be evoked both to argue for political control of research, and to justify a lax attitude to the problem of delimitation in pre-decisional inquiry.

As a matter of fact, recent developments in computer utilization for data base management and networking have made it possible to create systems for information storage and retrieval which enable the researcher to find his way in the literature in a more consistent and comprehensive way than ever before. These new possibilities, both in "current awareness" and in "retrospective search", call for new ways of approaching information problems in research planning and research proper. They also create new responsibilities on the part of funding agencies and the researchers themselves. In the present article I will point at some of these recent developments, with examples drawn from the Scandinavian scene, and indicate some of their implications and principal issues that need further consideration in the future.

My principal thesis, stated in a simplified form, which is probably controversial enough, will be that the technological university library (TUL) is in fact not in any strict sense an information centre for industry, but that it has specific important functions in a network of Scientific and Technical Information Systems and Services (STI/SS) which co-exist in a kind of symbiotic or feed-back structure. In a sense, what I want to discuss is distinctive user requirements in technology as compared to those in science, as first indicated by Derek

Price,[28] and the difference this makes to services needed.

My presentation has no claim to be a complete study. On the contrary it should be taken as an interpretation and possibly a framework of thinking, with some new and as yet half-baked ideas perhaps worth elaborating and considering in policy analyses for the future.

III. Information centres and the R&D system

A concept of an information centre has to be restricted so that it is not trivially applicable to any kind of information service. One possibility, which may have to be amended as the discussion progresses, is to say that an information centre is an institution that collects and supplies substantially *all* information relevant to a category of users in a number of specified areas of knowledge and for a number of specified kinds of use. This should mean that a consultation should have a favourable *a priori* perspective for satisfaction and reliability. The obvious criterion is a record of past success where most relevant existing material was disclosed and accessible on request, whereas *vice versa* failure in disclosing material might rightly be interpreted as true lacunae of information.

The idea of a technical university library *as* an information centre seems to be linked to the non-separability of technology into disjoint disciplines of R&D. The requirement of comprehensiveness already makes it highly questionable wheter a truly polytechnical library really can work as a centre by itself in a strict sense. Rather one should look for a systematic total conception of STI/SS where the role and responsibilities of a technical university library can be seen in a complete context of the system which it serves and with which it interacts. It seems necessary to consider questions like: "What information is handled, for whom, and for what use in which context?" and: "What operations should be cared for in which environment of alternative (substitutable) and supplementary sources of information?" The answers, of course, have to be related to the needs of the user, in this case the industrial user of STI/SS. Presumably the purpose of his use of STI is primarily development of new products. Four stages may be distinguished:

(a) investigating needs of information for policy decisions
(b) accumulating available relevant knowledge
(c) selecting objects for development and future investment
(d) supporting applied R&D that generates new insights.

In view of this simple analysis, it is not surprising that our definition of an information centre applies in a limited sense to a number of quite different institutions, which supplement each other in serving the needs of the user community, whereas it only applies to few if any single organizations. This observation is the point of departure for some considerations, which might be useful in an assessment of the present and future role of the technical university library.

Apparently some of the needs mentioned are more for socio-economic information than for STI, though they are not unrelated. Production policy and planning must be based on joint considerations of technical feasibility, economic justification, social implications, desirable and less desirable side-effects etc., decisive for marketing. Even with regard to pure STI-oriented needs, there is no obvious relation between ways of need-fulfilment and the subject matter of the demand. Rather the ability of the customer to see his problem, to assimilate and process information and to apply new insights is extremely individual and not always necessarily rational. This means that any single information problem can be approached from a variety of angles and defined, studied and solved in various ways. There are not even clear-cut criteria on what should be counted as a "solution" in a given context. One implication of this vagueness is the unclear separation of STI/SS from the entire R&D system in which information and the intangible substance of "relevant knowledge" is generated, processed, and applied.

An example of this difficulty is given by the unsuccessful effort in defining statistical indicators for STI-activities and to forecast developments of the STI-system. Had it not been methodologically so ill-conceived, the Anderla study[4] (and this also applies to the Swedish Delphi study on information systems and services)[35] might have rendered interesting assessments and incentives for policy formation and planning for the area of STI/SS. Even the presently best available systems analysis concerning STI[14] brings into prominence the importance of subjective judgment and sound intuition in the construction of any descriptive model. What is considered as disjoint (not overlapping) subsystems and as functions and interactions is by no means evident. Frequently, when we are presented with a block diagram, we cannot say what should go into the boxes, what is the meaning of the arrows, what is the significance of interactions, and how perturbations propagate through the system and possibly even cause restructuring. Not surprisingly it appears that many available studies on user needs and habits and on STI/SS structure and performance suffer from what may be termed the "5C-syndrome" characteristic of soft sciences, viz. a lack of consistency, comprehensiveness, coherence, compatibility and conclusiveness. Stated bluntly like this it is of course an unjustifiable generalization. It contains, nonetheless, a grain of insight, which becomes apparent enough when it comes to the "pragmatic" situation of applying recommendations arrived at.

Probably this is one reason why there do not exist really useful statistical data on STI-activities and why there is no real interest in obtaining any. A pilot study was initiated by NORDFORSK[10] some years ago, but it did not result in any continued efforts, and when the question was raised recently response was rather cool. The related area of R&D statistics obviously attracts more interest both nationally and internationally. In 1973 NORDFORSK issued a procedure aiming at R&D statistics compatible with international standards[36]. Such statistical data give some idea of the manpower situation and investment in industrial R&D. However the user community and STI-needs of industry are obviously broader than those defined by R&D proper. On the other hand, due to the strong international linkage of innovative industry (in particular multinationals) much of what would normally be local STI-needs, in practice is tranferred to foreign R&D establishments and STI/SS.

Another indicator of structure, size, and needs of the industrial user community is given by experience and statistics of the technological university libraries and documentational centres. Here the estimate is distorted by the existence of industrial libraries which cater for the general needs of STI, and of which we do not know much more than the approximate size and (through our role in production of the union catalogue of technical journals)[26] their subscriptions to foreign periodicals. Further the demand is related to the perceived quality of the STI/SS, judged from the relation between appreciated returns in terms of improved performance and the more easily determined efforts and costs spent in obtaining information. It is in the nature of things that new needs can be created by the availability of new resources, as exemplified by SDI-services, and conversely difficulties in access to STI will result in a decrease of utilization. Thus, demand is not in an obviously causal way related to the actual and potential needs.

Limitations in present understanding of the industrial user community may not be serious when describing the present role of the library, but it may be serious enough for an assessment of this role and it may hamper the possibility of estimating the potential needs and of making reliable forecasts for a functional development of STI/SS.

IV. What do they need?

In discussing the role of libraries as information centres, an important question concerns the needs of the user community. The next thing then is to analyse how these needs might be fulfilled, whether in fact they are fulfilled and what is the relation between various services available for need-fulfilment. Though, as stated before, it is extremely difficult, if not impossible, to make a clear-cut and reasonably time-independent statement about needs, many interesting results from various investigations are available. One recent report, which we would like to quote here, concerns the Battelle study conducted for the "Rationalisierungs-Kuratorium der Deutschen Wirtschaft"[2]. The following five activities for information transfer to industry appeared as being of primary interest:

1. Information analysis centres as complements to documentation centres.
2. Active gatekeeping as a standard function of local libraries and documentation centres.
3. Systematic search and preparedness for innovation and for redirection of present lines of production.
4. Integrative futures studies, including considerations of the (economic, social, political, physical) environment.
5. Resources for diversified search through informal sources, focused on information relevant for innovation and development.

Nothing of this is particularly new, but it is symptomatic for the need of taking recommendations seriously, which were made already in the Weinberg report[33] and later in the report on scientific and technical communication issued by the (US) National Academies of Sciences and Engineering.[34] What happens now in the development of new information systems and services can in fact be seen as a response to (and acceptance of) such more or less general statements of present and future needs.

On the other hand it is worthwhile noting that much of the policy in the STI/SS area is based on a general (or perhaps trivial) philosophy concomitant with the earlier mentioned 5C-syndrome concerning the condition of understanding of the system. It may be stated in a brief (vulgarized) form as: "All progress is based on existing experience and knowledge. Therefore, better awareness of what is known (and of what people think is known) is a necessary prerequisite for rational action". This of course is a very vague statement which does not tell us what to do and how to evaluate what we are doing. It should be observed, however, that this simple philosophy is not unconditionally valid even as stated.

The problem is analogous to the one experienced by systems analysts trying to construct complex management information systems. In a well-known essay, Russell Ackoff discusses five misconceptions frequently taken for granted without justification:[1]

1. "Give them more" (the real issue being over abundance of irrelevant information rather than lack of relevant information)
2. "They need the information they want" (the real issue being that information needs cannot be specified until the decision-problem and process is understood)
3. "Give them the information they need and decision-making will improve" (the real issue being that the meaning and value of information rarely can be uniquely determined and that decision-

making is not perfectly rational)
4. "More communication means better performance" (the real issue being that stable systems need a certain element of redundance and competition for efficient functioning)
5. "They need not understand how the system works, only how to use it" (the real issue being that a system is tailored to certain specifications which determine its performance in a way not necessarily compatible with dynamics of real-life-situations)

The moral of these considerations, applicable almost verbatim to STI/SS, is that it is in principle not possible to find standard procedures that will reveal the individual user´s needs. Instead, the development of services should preferably be directed at more individualized contacts, where the function of the library and documentation centre tends more to true participation in solving customers´ problems.

The problem of functional selectivity has an interesting facet with respect to the role of the information centre (in the sense defined here) as "environment" for creative work. Being confident that a centre will be able to satisfy our needs of STI gives us a kind of relaxed state of mind necessary for independent contributions. Quoting Herbert Simon:[30]

> We cannot avoid living in a world that drenches us with information - whether made by Man or nature - but we *can* select for our processing the information that is likely to be useful to us, and ignore the rest. Gertrude Stein (...) said: "I like a view, but I like to sit with my back turned to it". We can follow Miss Stein´s example of independence from the environment of information. Our scientific and technological knowledge, our decision-making and information-processing systems are means for permitting us to turn our back to the view - or to gaze on it very selectively, extracting from it just the parts we want.

V. Reading habits and accessibility of literature

With the present size and rate of growth of STI it is hardly possible for any single polytechnical library to keep effectively complete collections, even within the limits of research going on in its associated university. It would also be unreasonable from cost-effectiveness point of view, since the relative share of peripheral literature is necessarily growing with the total system. The natural development has therefore been to establish a network of co-operating libraries, whose total holdings of literature can be utilized as a shared resource. Such a system has been working for a long time in Sweden, incorporating all the major research libraries. The system has also been extended to the Northern countries and by special arrangements outside the northern region, for instance including services from the British Library (BLLD).

To improve efficiency of the system, special efforts are introduced to minimize costs of catering for less frequent and peripheral literature. One example is the Scandia-plan,[3] by which the responsibility of holding certain sets of foreign scientific periodicals is distributed among the participating libraries (for instance the Chalmers Library answers for technical periodicals from China and Japan). Another example is the handling of older collections. Scientific libraries in a region (as in the case of Stockholm) may co-operatie in the management of a common depository with rapid access.

To date quite a number of computerized interactive library information systems have been designed and developed. Projects with a comprehensive scope have encountered considerable difficulties already in the stage of specifying operational requirements, which is after all a common experience in the design of multi-purpose systems with a complex and opaque information structure. This is the case for the very ambitious Swedish LIBRIS system which has been accompanied by rather too much premature publicity. As a first phase, however, in the near future integration of scientific libraries in Sweden will be pursued to the point of direct access to a continuously updated computerized central catalogue. A similar system, with perhaps more realistic long-term ambitions, is being developed by the Danish National Technological Library.[21]

Electrostatic photocopying has had a profound influence not only on library services, but also on reading habits. By offering photocopies instead of lending volumes of periodicals, continuous access is assured at the library, whereas the user can build his own collection of pertinent material very efficiently. This development also suppresses the traditional circulation of reprints. It is our impression that the impact of this "new" technology is reaching a point of saturation, i.e. that the services offered correspond reasonably well to demands. These are determined by a balance between over-utilization (with awkwardly growing personal collections) and under-utilization (with correspondingly inefficient information access). Copyright problems associated with new reproduction techniques and attitudes towards their application are now given appropriate attention.[18]

The development of micrographic products has amazingly not reached the point of standardization and development which would have been expected with regard to advantages and the technical possibilities. However in certain areas, e.g. catalogue products, introduction of these techniques seems to be fairly successful. More generally, future developments in accessibility to STI will be closely dependent on new technologies in visual communication. Relatively recent advances in optics and electronics are going to push economically justifiable utilizations of information storage, processing, transmission, and display into what will appear as drastig changes as compared to the present.[29]

VI. Computer-based bibliographic services

The definition of an information centre contains not only a clause concerning accessibility of information, but also one concerning reliable searching instruments and procedures. Various secondary publications have been produced in increasing quantities ever since the beginnings of the scientific revolution, as demonstrated by the well-known diagram presented by Derek Price.[27] The capacity of computer technology to aid in editing and updating of secondary sources was realized at an early stage. This gave rise to a number of bibliographic data bases, which now are used for automated current-awareness services and for retrospective search. Exceedingly interesting potentialities, as yet not fully appreciated and utilized by the user community, are inherent for example in the Science Citation Index. The printed versions of most of these secondary sources are commercially distributed in such a way that they can be made available in research libraries. The tape versions however are offered under conditions specified in individual contracts.

Documentation centres operating within technical libraries have developed very advanced software systems for efficient handling of data tapes.[23,24] One of the difficulties is related to the lack of standardization of record formats. Fully operational SDI (Selective Dissemination of Information) systems are now giving regular current awareness service to a growing user community involved in R&D. Notable in the Scnadinavian area are in particular the work done by the Danish National Technological Library (DNTL) and the Royal Institute of Technology Library (RITL).[15] The Scandinavian countries are linked to the ESA/RECON system by terminals in Copenhagen and Stockholm, which permits on-line access to the data bases in Frascati for retrospective search.[19]

Dial-up nodes installed in 1976 at RITL and DNTL have extended the ESA information network to all terminal-equipped users in the Northern countries.

Until now the management of the STI services, including construction and handling of individual-oriented search profiles, has been an exclusive documentation-centre activity. The profiles run at the RITL centre have mostly been constructed there in co-operation or dialogue with customers, though profiles for some services, e.g. those channelled through the Libraries of the Norwegian Institute of Technology and the Helsinki Institute of Technology, have been supplied. Considerable interest was shown in decentralization of the SDI system. The idea is to make the operations of profile construction and modification possible via terminals located in industrial library and documentation centres. The results of the searches are then sent directly to the subscribers from IDC-RITL. There were some problems inherent in this kind of interactive operations, in particular concerning the terms of contract with data base producers and the screening and security problem of protecting individual or institutional customers from undue insight. This latter problem was dealt with by a research group at the RITL.[31] In October 1976 a security device was implemented on the profile file. By July 1977 not only IDC (the documentation center of RITL) and MIC (the medical documentation centre at the Karolinska Institutet), but also twelve other information centers were keeping their own profile maintenance.

Concerning the role of documentation centres in a future state of decentralized operations, it seems evident that a continuous evaluation and exchange of ideas and information will be necessary between centre and customer. This dialogue will have the function of a control mechanism to avoid a closed and reiterated search procedure and to guarantee full utilization in terms of output reliability and user satisfaction to the level of the system s capacity.

Quite interesting possibilities are inherent in the development of an internordic data handling and transmission network, SCANNET, which is one of the NORDFORSK[17] projects. The network, dedicated to the transmission of STI, is fully operational since August 1976. In January 1978 one data bank, five bibliographic interactive data bases and EPOS (the profile handling system for VIRA[23]) were available through SCANNET.

VII. Non-conventional literature and invisible colleges

With respect to services mentioned up to this point, the TUL may appear to the customer as an information centre, even though in fact this is achieved by maintaining the library network liaison. However, the formal or formalized information sources made available in this way do satisfy the true needs of STI only partially. What has been termed "informal communication" is of major importance in all innovative activities.

Informal communication proceeds in channels or networks that are established *ad hoc* between interest groups and institutions. The process by which new prospective members are selected and admitted is dominated by peer assessment and personal relations and it may appear as informal as communication itself. The phenomenon of "invisible colleges" described by Derek Price[27] in his analysis of the formation of research fronts in "pure" science is in a sense a particular case of a sociological structure characteristic of innovative processes. Even though open critical debate is the life-blood of the scientific enterprise, too much publicity in a premature stage is certainly counter-productive.

In technology, where progress is not exhibited in the open in the same way as in science, the structure of information transfer is different, being inhibited *inter alia* by economic interests. The difference certainly emphasizes still further the fragmentation of information users into "insiders" and "outsiders". Information is circulated in the form of reports, preprints, unpublished data sets etc., which may occasionally be referred to in published sources, but are not generally accessible to the "outsider" by simple consultation of a research library. One of the problems of this phenomenon, which probably is unavoidable in the present society, is the uncontrolled circulation and quality of information, since it bypasses the regular critical dialogue to which published material is exposed.

Some of the non-conventional literature is in a sense semi-official and can be accessed by special efforts. We might here mention the technical attaché service, organized by the Swedish Academy of Engineering Sciences (IVA) in countries like France, Germany, Japan, China and USA. The main task is to facilitate access to important material, like conference papers and manufacturers' product information from technical fairs, and channelling it directly to interested parties.[37]

A large part of the report literature may perhaps be called "quasi-white" because access is in principle open but screened by various uncontrollable barriers. This may be exemplified by reports from US government supported research, which are publicized in the abstract journal *Government Reports Announcements* and part of which are widely circulated in microfiche format, though in many cases with so long a delay as to be prohibitive for efficient use.

I have discussed these phenomena in the present context, since they yield an obvious instance indicating the limits in principle of the ability of TUL to act as an information centre in the sense defined. This is so much more embarrassing as it concerns the very essence of what is going on in the forefront of research and innovation.

VIII. Information compilation and analysis centres

Secondary information sources are, as mentioned above, fundamental instruments for access to STI. Obvious examples are abstract journals and less comprehensive bibliographic publication along with their associated versions on magnetic tape, made available for various computer-aided services. These are examples of products from pure compilation activities. Just as important, however, are publications resulting from intensive evaluation of assembled material. Handbooks like Beilstein and Landolt-Börnstein are examples, as are (in another form) the various series of annual reviews or "progress in..." volumes presenting survey articles in specific areas. All these activities of specialized information compilation and analysis centres (or individual experts) mentioned have a sufficiently general scope to yield an economic basis that permits the products to be made available by the intermediary of research libraries and documentation centres. There are, however, important areas of STI, which by their nature are excluded from this kind of presentation and utilization. There are information centres that serve a very restricted user community, which implies that printing results is not justified; services are rather given in the form of computer printout. Even in areas with a user community sufficiently large to justify publication, the need of up-to-date material may result in a decided preference for computer-assisted services from a data bank, possibly in terms of interactive search. The services of information analysis centres in Science and Technology are usually not channelled through research libraries, but are rather made available on request directly to the user or his organization. This has the advantage of giving a certain control of what information is disseminated, so that amendments in the form of updating or cancellations may be communicated without undue delay and administrative efforts. This control feature to some extent makes it possible for a centre, having gained a good reputation in its services to the R&D community, to become a kind of peripheral institutional member of an "invisible college". Although an informal status, it may however be the basis for access to part of the "grey" or quasi-white literature and data that are dispersed in the invisible college corridors.

In some cases activities of this kind are financed by governmental or international funds or even by industry. Typical examples are the Swedish documentation service for environmental problems,[25] the INIS-operations, and certain types of product catalogues, e.g. of components for electronic industry. The financial problem is however in many cases another reason why information compilation and analysis centres of various kinds have to bypass the TUL. An example is the computerized catalogue (IMPAT) of patents applied for in Sweden.[20] This system enables subscribers to keep informed of the latest national (even international) developments in their area of innovative efforts. Another example is furnished by the DATAPRO-system.[8] This is a comprehensive evaluation of computer systems available on the market, (a kind of *Guide Meichelin* for the electronic data processing world).

Under present conditions, the economic viability of such services can be achieved only by subscription.

In this context it is adequate to mention a category of information and documentation centres that render various services on subscription or consulting basis. Two very interesting organizations of this kind are the Danish Technical Information Service (DTO) and the Norwegian Centre for Informatics. For this reason we here quote the terms of reference of the Danish centre:[9]

> *Aims:* The object of DTO is to promote the utilization of existing knowledge within technology and its associated areas of science, economics, and management with the intention of supporting Danish industrial enterprises and public technical services.
>
> *Performance:* DTO attempts to serve its purpose by such means as:
>
> - visiting industrial enterprises, public technical services, research and development centres, technological service centres, libraries and technical advisory services in order to promote the establishment of contacts aimed at improved conversion of knowledge into practical results,
> - assisting in or arranging meetings, conferences, courses, etc. to further the exchange of knowledge,
> - assisting, in accordance with need, in the procurement of relevant information from domestic or foreign sources,
> - assisting in accordance with need, in establishing and operating specialized advisory and information services, aimed at the utilization of knowledge.

IX. Budgeting and cost-benefit analysis

When discussing the role of TUL as an information centre it is important to consider economic aspects of various activities and their development. Inevitably, increasing resources are needed to maintain and develop a polytechnical library and to satisfy qualitatively and quantitatively increasing demands. In spite of efforts to rationalize operations and to distribute responsibilities, the growing system of STI cannot be handled in a satisfactory way with what, due to inflation, effectively are decreasing budgets. At present, allocations are frequently calculated on very rough estimates for compensation of rising costs, the general policy being stated as "retaining a constant level of ambition". In the technical area this compensation turns out to be inadequate with regard to any reasonable definition of the concept of a "constant level of ambition". In response to claims for more realistic support, it has been suggested that, to cover their costs, libraries and documentations centres should introduce charges for their services rendered, (or increase present charges).

Applications of cost-benefit analysis to STI/SS have recently been carefully examined.[12] The basic problem is, of course, that information is a very intricate and elusive kind of resource, which cannot be fully tracked down in terms of an economic analysis of the cost-benefit type. It is in the nature of research and development that the "true" benefit of information and information services cannot even be defined and appraised in a unique way, thus still less in terms of what a customer would be prepared to pay. What we would be trying to do is in fact to treat as a time-independent parameter what is really a variable, namely the subjective appreciation of the value of a particular "piece" of information to a particular person in a particular context. For example, going astray and discovering dead ends is part of normal experience in research work towards personal understanding and advancement of knowledge. Further, the use one can make of information received is strongly dependent on his actual state of understanding and knowledge, which, hopefully, develops in the course of time as work proceeds. Even after the termination of a successful programme, it is not possible to reconstruct the history of ideas in such a way as to justify a statement about the value of information actually (or hypothetically) received in various stages.

It might seem more rewarding to study the gross features that determine the success of STI/SS. Unfortunately, assessment of performance and usage meet with analogous difficulties as are inherent in the analysis of "value" of information. Any practicable measures are composite indicators which cannot easily be resolved into unique estimates of quality and benefit (cf. the 5C-syndrome discussed earlier) and so be taken to justify pricing of services. Such assessments do not even yield a sufficiently immediate and unequivocal feedback so as to be of real help for policies and developments of STI/SS (at least not without simultaneously making recourse to suggestions in principle arrived at by "theoretical" means).

Complexities in the role of STI are thus related to the irrational or "intuitive" element in creative performance. Possibly without conceptualization of these difficulties, it has been an important and unquestioned feature of research libraries to be able to offer services either free or with large subsidies. Support to libraries and documentation centres is probably a very cheap way to encourage innovative activities by offering at least a common environment of "complete" access to available information. Introducing charges for information services now rendered by TUL may have undesired socio-economic implications. Due to the difficulty of evaluating the immediate benefits of services, such charges would undoubtedly result in decreasing utilization of available STI. This may subsequently have the effect of weakening innovative power and general performance, at least for medium-sized industries.

Not surprisingly, it turns out on a close examination of the whole problem, that it would be extremely difficult to define a cost-benefit-inspired strategy of pricing that would not involve risks of serious undesired and counter-productive effects. As a conclusion, financial support of TUL´s in their role as information centres to industry should be viewed in a systems perspective wide enough, i.e. on the level of national economy, to allow for a complete structural analysis of benefits resulting from traditionally free or quasi-free services. The continued support of this principle certainly is a necessity for efficient utilization of the nation´s innovative resources.

X. Ethics of information centre performance and usage

Ethical problems are notoriously difficult to come to grips with. This is one reason why they are avoided subconsciously, or even explicitly as being unimportant for practical purposes. As I see it, the case is in reality the opposite: consciousness and conscientiousness with regard to certain questions of morality, such as the related concepts of "responsibility" and "reliability" are of fundamental importance to one´s attitudes and conduct. I will therefore briefly try to show what this has to do with information handling.

As a starting-point we may consider the relation of rational action to information. (For simplicity I here include the preparatory steps of planning and decision-making in the concept of action). We may assume that rational action is based on inquiry into background information and subsequent assessment which would make it possible to anticipate outcomes of alternative decisions. The question to ask is: on what grounds does the decision-maker decide that he has spent a sufficient effort on obtaining and analyzing background information?

In most cases an action also affects others than the agent himself. It is the relation of the agent (and of his action) to these other persons that introduces a state of responsibility. When using the term "responsibility" I do not refer to the retrospective sense of accountability "after-the-fact". Rather I think in terms of a prospective meaning: the agent has been assigned a role or function which he is (morally or legally) obliged to sustain. This obligation is more than a duty,[7] since it cannot be regulated in advance, but requires initiative, judgment and foresight. Too weak performance as well as undue performance (i.e. outside the limits of delegated responsibilities), will both conflict with the commissioner´s confidence, expectations, and rights.

Any situation, where an agent contemplates action that may affect others, could be viewed as a state of responsibility in this sense. The agent has to consider a spectrum of alternative actions, along wiht primary and second-order consequences,[6] and to judge possible choices with regard to norms, values, and goals. The fundamental difficulty in this process is associated with uncertainties in available information and knowledge. Preparations for decision-making therefore to a large extent deal with reduction of uncertainty.

For the agent, the obvious criterion for a sufficiently well founded decision is that he feels convinced about his decision being consistent with a complete consideration of his state of responsibility. The dilemma is that the agent´s opinion may not be shared by those affected by his actions. Therefore control-mechanisms are needed e.g. in terms of political or legal accountability. However in most cases only a "moral accountability" would ensue, and in any case, the control mechanism should preferably act to prevent damage rather than to act retributively. The function of such control should be to generate in the agent a state of mind where he endeavours to be not only able to defend his contemplated action, but also convinced of not being prone, later on, to the justified reproach of not having taken into account all relevant information that would in principle have been accessible.

Now the concept of "would in principle have been accessible" is of course very vague and does not help the agent much in deciding where to put an end to efforts in preparation of decisions. It is fair to say that criteria for a reasonable level of inquiry into background information must be related to the agent´s specific situation: his function (whether assigned or assumed), his executive powers and external restrictions to his ascendancy. Obviously (when specifying for clarity) the range of considerations to be covered by a business executive is much narrower than that expected from a secretary of state, since the former´s primary responsibility is the progress of his enterprise whereas the latter´s is the pursuit of national interests in terms of government policy and existing regulation. It must be noted, however, that the executive of this comparison can be left with his in many ways narrowly "pragmatic", or utilitarian ways of delimiting his information problems (which may even be at variance with his own moral point of view) only because there are control mechanisms to safeguard the larger environment. And conversely if a subsystem (e.g. an industry) tends to have dysfunctional effects on its environment (e.g. on the regional or national level) control mechanisms, such as legislation or social/political pressure, will be created or activated. This argument seems to indicate that even if the "reasonable" level of pre-decisional inquiry (and thus information needs) must be judged relative to the agent´s function, any particular function determines the scope of considerations expected for responsible action.

The question arises how one normally decides (and how one learns to decide) what is a proper basis of understanding for rational action. This is, of course, intimately linked to the economy of disclosing and considering supplementary pertinent information, where the term "economy" refers not only to financial resources but also to resources like time, competence, and availability of STI/SS. The traditional way of learning how to get the right feeling for the entire "Gestalt" of a crucial situation and associated information needs is, of course, by apprenticeship. In the process whereby e.g. a student acquires research experience, this way of learing becomes apparent in the stages where his arguments and results are evaluated in relation to the international foci of interest and standards of excellence. It may now be argued that the social institution of apprenticeship (as is in fact the entire critical feedback process in science) is impaired by the rapid change in structure and content of the research system, with the consequence that the agent will more than before be left to rely on his own judgment. This emphasizes the important role of libraries as information centres in the sense understood here and more generally the role of STI/SS.

Determination of a proper level of understanding certainly remains a subjective process, though restricted by existing or perceived external control mechanisms. However, the emergence of STI/SS in a sense pushes the required level of effort a good bit further than it used to be. It may be seen as a new kind of resource which has a definite impact on the economy of predecisional inquiry though information services, as argued before, are very difficult to evaluate in economic terms. One reason is that they have an immediate impact on some important effects originating from the psychology of creativity and decision-making. One of the basic inhibitory factors with regard to comprehensive, yet rational, selection and evaluation of information is the phenomenon of a "convenience factor".[22] Resistance to efforts whose returns cannot be estimated in advance tends to reduce the cognitive level of preparatory work for decision-making. In other words, what is difficult to disclose and obtain (or understand) is simply ignored. This principle is related to (and tends to be taken as justified by) an apparently deeply rooted bias in heuristics for decision-making under uncertainty: the subjective weight and appreciation allotted to information that is within reach (to obtain or to understand) is increased, sometimes to the degree of screening off supplementary information.[32] This effect is particularly strong when the supplementary knowledge is, or is supposed to be, incompatible with earlier information and conceptions based on it ("reduction of cognitive dissonance").[11] (To the same range of phenomena belongs the resistance of scientists to discovery.[5])

The point is now, that offering convenient user-oriented services specially designed to facilitate a good grasp of one´s subject (like selective dissemination of information and retrospective search) eliminates at least part of the moral security and "justification" allegedly given by the socio-psychological effects referred to. Through these new services, the bulk of "what is in principle available" and in reality easily accessible at the right time is thereby considerably increased, which entails a correspondingly extended responsibility for the agent to take this material into account.

A new question arises with the activities of information analysis centres. There, information (e.g. empirical data) is surveyed, selected, processed, and evaluated, and only part of these operations are completely described and accounted for. Some of the *raison d'etre* of their work is an expected reduction of multiple effort, in particular in areas where uncontroversial results can be obtained. However, hardly any results are definitive, and a number of open ends are usually implicit or explicit in presentations of results. By offering a bald output, and claiming a kind of authority (inherent in the mere concept of "analysed data") the information analysis centre assumes some sort of shared responsibility for the use of its products. What this share really means is not easy to define, but it is an important point to clarify, since it is present in practically any information service that involves a selective output.

Any organization that has been assigned or has assumed the function of an information centre has to deal with this problem of shared responsibilities. It derives from the fact that the claim of fulfilling a central function creates a legitimate claim on the part of the customer that he should be able to rely on services offered as to comprehensiveness and completeness. This reliability aspect inherent in the idea of a centre implies that the centre in a sense participates in the customer´s objectives. This is the origin of the shared responsibility, and it is worth noticing that it is not possible (morally) to get away by refusing to recognize it or by ignoring it with reference to the supposedly "neutral" act of supplying information that has been solicited by direct request or by implications of inquiry. Of course, by abstaining from the claim of a centre-function, this share is (at least to a large extent) discharged assuming that selection is reasonably unbiased and information given is undistorted.

XI. Education and promotion

The final point I want to make concerns the function of education of users and promotion of services. The full impact of computer and communication technology now made available to library and documentation services can be achieved only if the customers have a sufficient knowledge of systems and operations. The importance of training programmes has been emphatically stressed in a recent study on "critical research needs" in the context of users and use of STI.[13]

A number of programmes [illegible]ve been introduced aiming at a sufficiently close continual co-operation between the customer and the library and documentation centre. As examples I might refer to the curricula developed at RITL and at Chalmers TUL. Apart from training in the processes actually performed at the TUL, there is, however, a need for more general knowledge on the structure and utilization of the entire network of different STI/SS. Unfortunately, not even in the technical university has it been possible to introduce sufficiently comprehensive programmes since the full schedule leaves no room for what in a narrow perspective may appear as esoteric speculations on how to cope with hypothetical future information need situations.

Extensive experience from RITL activities show that there are very large potential "markets" for development and extension of various computer-aided services to industry.[16]As a secondary effect, such an increased demand for current-awareness services and retrospective search will, of course, increase the requirements for back-up services of literature from the TUL. A clearly observable increase, on the part of industry, of demands for qualified scientific literature may perhaps be explained as the combined effect of a younger generation of engineers (used to reading at least Anglophone literature), and the new comprehensive user-oriented information services.

One might speculate that the present "scientification" of technology may call for a new attitude and approach to literature on the part of the innovative technologist. New reading habits, like scanning large amounts of abstracts and text, and browsing in numerous journals in other areas than one´s "own", may have to supplement the conventional "orderly" way of consumption. Instead of supporting a growing "expertocracy" that takes care of important decisions on complex matters, the new way of mastering STI (and other important background information for decision-making) may enforce the critical attitude of individuals and the possibilities to "judge for oneself".

Obviously this cannot be achieved without effort, and part of the objectives of education for use of STI/SS should be to create awareness of existing potentialities of the systems. Education should also emphasize the need for a greater sensibility to the moral content of the phenomenon of STI/SS. It is by no means clear how responsibility concerning selection, evaluation, and use of information should be shared between the user and the custodian of STI (e.g. as represented by the TUL). Certainly this distribution of responsibility is a very hard problem which has to be considered separately in each case. The first thing is to make it explicit and clear, and this can only be done by a continuing dialogue, which for those involved has a function of mutual education.

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35. *Information, documentation and media - a futures study based on Delphi-technique* [Information dokumentation och media - en framtidsbedömning med Delfi-teknik] (Statskontoret, Stockholm 1975 [in Swedish])

36. NORDFORSK. Handbook for R&D statistics [Handbok för FoU-statistik] (Stockholm 1973 [in Swedish and Norwegian])

37. Technical and scientific attaché services (Teknisk-vetenskaplig utlandsrepresentation) (Stencil from the Ministry of Industries Ds I 1973:1 [in Swedish])

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CATALOGUING AT RITL

by Asta Dahlström

Automation - A sad and a long tale

The Royal Institute of Technology Library had been chosen as one of the five pioneering test libraries for the Swedish automated library system, LIBRIS, because of our earlier experiences in automation. Preceding the period covered in this report, our first input had been done with a punched tape (Facit 6210) on March 13, 1972, and in June that year a CDC 92414 terminal had been furnished with about two hours of online availability daily, for exercises, and from October 17th for regular input. By July 1973 searching and cataloguing routines were thus operational, i.e. limited searches on ISBN, ISSN, author and title, as during the whole of what is called the 'LIBRIS I' period which was in fact prolonged until July 1975. By July 1974 close to 2500 records had been input, of these some 200 tape punched, necessarily, since the CDC terminal lacked diacritics. After that time the awkward and very much disliked tape punch procedures were discontinued in anticipation of an Incoterm SPD 10/20 terminal which would be able to take in all the records and would be available in October 1974. In January 1975 it was finally installed and ready for use, with an online connection to the central computer serving about two and a half hours daily, increasing by and by to four hours and from July 1975 to roughly all the working hours. This terminal had really been intended for the introduction of what is called 'LIBRIS II' (i.e. LIBRIS in accordance with international standards, cataloguing rules and format) but 'conversion day' (i.e. conversion of data base to the MARC/BNB format) had been put off so that our staff, who had been trained for LIBRIS II routines on this terminal, had to acquire new skills, how to simulate CDC- and LIBRIS I routines on it. With never ending new instructions, amendments, interruptions, equipment failure, waiting time due to slow response, other terminal malfunctions, etc., it was terrific for those who had to stick it out. And all this effort served, in fact, still no other purpose, from our point of view, than the equivalence of preparing and posting a pack of catalogue cards to the Bibliographic Institute for inclusion in the Union Catalogue of Foreign Literature in Swedish Research Libraries, (AK), a couple of day's work for one person, whereas the inputting to the LIBRIS data base was summed up as all the working hours of one person. With a staff dwindling from six and a half to four and a half, something else had to be given up, so first our automated accessions list had been discontinued in January 1973 to be replaced by copies of AKN/NAT (AK, New accessions, Science. Technology. Medicine) for subscribers on a gift and exchange basis. Then the cataloguing of dissertations (which had been going on for twenty-five years) was ended as well with a few exceptions. On the first of July 1975 the data base was converted to LIBRIS II which delivered us from the superimposed LIBRIS I routines at input. But the benefit of shared cataloguing, i.e. only adding local classification codes and shelf numbers etc. to the record in the data base, as had been envisaged and eagerly expected, would not come true. As there were no no fresh LC/BNB/MARC tapes read into the system (in April 1976 only 20000 MARC records, i.e. a backlog of what had accumulated in one year) these records were seldom hit upon, and as the LIBRIS I records had to be submitted to a lot of corrections in spite of conversion, and as there were other participating libriries putting in minirecords to be added to, at last the workload for LIBRIS (foreign monographs only) was evaluated for a couple of weeks by adding time expended on formatting, stencil writing and terminal operation divided by the number of books catalogued and the outcome was more than 60 minutes for each item. The first relief occurred with the stop of stencil writing for foreign monographs in March 1976, as acceptable catalogue cards were now forthcoming from the system, at last, more than two years later than planned. That the national bibliography did not automate and change over to AACR in January 1975 according to schedule mattered less as there is very little Swedish literature catalogued at this library which is also included in the national bibliography. But there was still the problem with AKN/NAT which was intended to replace our accessions list, and which had not appeared since the 1974 single issue. However, LIBRIS II improved searches (institutions, congresses, parts of title and corresponding 700 fields) and the new terminal with outfit, in addition to improved keyboarding, also offered the diskette operating system used by the classifyer for creating 'Dewfil', a machine readable index to DDC, updated at intervals when new printouts were in demand. There had been no printer to our CDC terminal and this device was found exceedingly useful. It was resorted to when producing entries of our congress records to the Scandia Plan union catalogue, after an output requested from the system had resulted in unacceptable delay and an appalling amount of computer time. After four years of what the SAFAD still 1976 considers as a test run (LIBRIS, en lägesrapport) two goals had been attained, i.e. 1) international rules and 2) catalogue card production, and three failures had been evident, i.e. 1) the slow MARC files intake, 2) the AKN break down and 3) the delay, expense and bad quality of an extra output.

Cataloguing rules

There is a first and a second phase in the LIBRIS project because of the cataloguing rules. LIBRIS I was designed for the Royal Library rules, at that time still called the'Swedish' rules (akin to the Prussian Instructions) which had been introduced in the Royal Library as well as in other libraries in spite of Swedish participation in the ICCP conference in 1961. But whereas the Paris Principles were adopted by the Verein Deutscher Bibliothekare in January 1965, it would take a decade until the international rules were adopted in this country and published in Swedish. It was on the 13th of April 1973 that the Cataloguing and Classification Committee of the Council of Swedish Research Libraries decided on AACR/BT and translation of the code. This had long been anticipated in our library, as noted in the 1968/69 Annual Report, and prepared, e.g. in a concordance between our rules and AACR (KTHB-K-12-13, 1972) for the benefit of our staff as well as for the Tekniska Litteratursällskapet. AACR/BT was applied in this library since February 1973 for monographs formatted for input to the LIBRIS data base, thus two and a half years ahead of other Swedish research libraries. Now, inputting had of course to be done according to the Royal Library rules, but our staff soon became experts at tacitly letting one tag stand for another in handling bibliographical elements though formatting according to the BNB instructions and producing AACR catalogue cards. The change over was more easily performed in this library because the ancient Swedish tradition (corporate author headings to a certain extent as in AK) had been adhered to for nearly a century and, besides, shelving of books is independent of the catalogues.

Our staff had the benefit of following the elaboration of the Swedish version of AACR/BT by having one member in the 'cataloguing rules investigation task group' (KRUT), later the 'new rules introduction task group' (KROG) of the Committee for EDP in Research Libraries (FAG). These rules (SKR) which were published in May 1974, incorporated the ISBD/M and the ISBD/S and the MARC II format instructions, but also, alas, departures, considered 'Swedish' of which some were however later modified towards AACR in supplementary instructions. In the autumn of 1974 the SKR rules were applied in all cataloguing in this library, and when, at last, on July 1st 1975 conversion of the data base took place and input could start according to the new rules and format, it was an enormous relief for our staff to concentrate on one code only.

Classification

The 25-year period for our UDC (full edition) catalogue was running out and the start of a new subject catalogue, for the next 25-year had been pondered on quite a lot. Disenchanted with the UDC, its present state being considered as too chaotic and its future too uncertain for a catalogue that had to perform until A.D. 2000 with up to date entries into the LIBRIS data base all along, the classifyer had begun, in the spring 1972 to test DDC, trying out methods to cope with some 20000 codes instead of well over 200000. Classification being regarded as even more expensive than descriptive cataloguing, the possibility of profiting from existing subject analyses might well be examined, in preference Dewey, which is used in the national bibliographies covering the greatest number of our accessions, and being displayed in BNB, NUC, CIP and later on the LC/BNB MARC tapes which would be incorporated into the LIBRIS data base. In January 1975 the Dewey catalogue was begun holding new accessions printed after 1970, and alongside a Swedish language index corresponding to used numbers was built up. It turned out to be a great advantage to work with a classification system which is continuously checked against huge universal library collections. Lack of detail in subdivision can be compensated with subject headings as needed. According to decision in October 1974 by the FAG Committee a task group (BS REAL) was to be set ut to deliberate on how to make use of the subject descriptions on MARC tapes, and in March 1975 a member of our staff was added to this group. It goes without saying that a strong argument was delivered by our member in favour of DDC, to be introduced in the Swedish national bibliography as well as the classified catalogues of the Swedish libraries. The change-over to DDC in this library which had first been met with incredulity by others, at the end of the period covered in this report had attracted interest, not only in this country but also in Denmark and Norway. The Swedish language machine readable DDC index 'Dewfil' is intended to facilitate a translation of the Dewey schedules and Index.

THE ARCHIVES OF THE ROYAL INSTITUTE OF TECHNOLOGY LIBRARY

Dagmar Odqvist

When I retired from my post as deputy head at the Royal Institute of Technology Library I was given permission from Björn Tell, director at the time, to arrange the material kept in a special room called the Archives. This work was begun in 1970 and has now resulted in a catalogue of some 160 pages, published in the Library's series TRITA-LIB-2000 as no 2002.

The material of the Archives consists of three very different groups: manuscripts, rare books and certain other documents. The documents originate from the work of the Library as an institution. In the catalogue this part of the Archives is called the Library's History. The most valuable part of the manuscripts is the Johann Gottlieb Gahn Collection, mainly from the 18th century, dealing with mining and metallurgy. It came to the Library in 1939 and was described by the former Librarian, Hilda S Lindstedt. In addition there are also manuscripts by other well-known Swedes, such as I S Bagge, Urban Hierne and Christopher Polhem. Other manuscripts concern professors, other teachers and students of the Institute. These documents, in different ways, throw light on the development of the Institute and its main library.

A special group among the manuscripts consists of several hundred travel reports, the first one dating from 1849. They were often written by professors or other teachers at the Institute and give accounts of impressions and experiences from international exhibitions, universities and other educational institutions all over the world.

The rare books collection of the Archives proper has been kept very small, since the room actually used does not permit any considerable growth. Nevertheless this group comprises some compendia and notes of lectures given by teachers, because it was thought of interest for the history of learning to keep them together. Most of them are lithographic offprints but a few of them are manuscripts from the early years of the Institute's activities. A large part of the Library's collection of Swedish books printed before 1800 and foreign books printed before 1700 are now kept in the office room housing the Institute for History of Ideas in Science and Engineering Arts.

The collection concerned with the Library's History contains documents right back to the Institute's first fiscal year, 1827: the first card catalogue, the first annual reports and accessions lists, building projects with plans and photographs, governmental investigations in the field of scientific and technical library systems etc. Of special interest is a collection of more than 400 folio sheets, with reference to articles in periodicals. This may be looked upon as predecessors of the documentation service of today. It was begun by Alfred Henrik Fock, active as the Institute's first librarian from 1848 to 1858 and professor of physics 1858-70. The collecting was continued by Emil Fogelmarck, librarian 1858-1902 and first professor of pure mathematics in Stockholm 1875-99. The articles are arranged under subject headings filed alphabetically and cited from periodicals that were held by the Library at the time. In Fogelmarck's time some of his colleagues among the teachers took part in this documentation service. A complete account of these documents is given in the author's paper *Teknisk dokumentation omkring 1850*, published as The Royal Institute of Technology Library, Occasional paper 8, 1970.

The Catalogue of the Library's Archives (TRITA-LIB-2002) ends with an index of personal and geographical names and of some subject entries. The main part of the catalogue comprises over 1200 entries. Altogether the manuscripts and the rare books require some fifty meters of shelving.

Since 1968 I have answered to enquiries addressed to the Library from the Sächsiche Akademie der Wissenschaften zu Leipzig, Poggendorff-Redaktion. These enquires relate mainly to corrections of and addenda to biographical and bibliographical data regarding some 15 Swedish scientists and research workers who appear in Biographisch-Literarisches Handwörterbuch der exakten Wissenschaften begründet 1858 durch J G Poggendorff. Volume VIIb (1932-62) is in process of compilation.

LIBRARY USE AND USERS

by John Linders

Service hours

The central library at the Royal Institute of Technology now keeps the following service hours:

	Winter time (Sept through May)	Summer time (June,July,Aug)
Monday-Friday	Reading rooms 8.15-20.00 Circulation desk 9.00-19.30	Reading rooms 8.15-18.00 Circulation desk 8.15-17.30
Saturday	Reading rooms 10.00-13.00 Circulation desk 10.00-13.00	—— ——

The total weekly service time during winter amounts to 61 3/4 hours and in summer 48 3/4 hours. For service after normal office time ($16^{h}30$) eight students and one extra doorkeeper have been engaged. The full summer service was introduced only in 1975 and gave a fairly good response from library users.

Categories of library users

The total number of visitors has for a long time been at a level of 30.000 to 40.000. About 70 per cent of these visitors are classified as RIT staff or students. During the fiscal year 1975/76 about 90.000 volumes were taken out of the collections for library users. Of these, 40.000 were designated for loan and 50.000 for reproduction. Listed by category the following picture of library users obtains (percentages of annual total indicated):

	Estimate for 1975/76			
	Vols for Loan		Vols for Repro	
RIT	26.000	65%	7.000	14%
Personal	2.000	5%	2.000	4%
Industries	8.000	20%	32.000	64%
Other libraries	4.000	10%	9.000	18%
Total	40.000	100%	50.000	100%

This survey shows among other things that industry is the second biggest category of users of RIT library, about 40 per cent of the total use.

Categories of loans from the RIT collections

Main categories of loans are the following:

		1973/74	1974/75	1975/76	1975/76
direct to customers	Reading room loans	11.374	8.927	13.541	28%
	Home loans in Sthlm	20.029	16.901	19.618	52%
	Inter-library loans within Stockholm	1.057	795	949	2%
to other libraries	Inter-library loans outside Sthlm	5.227	5.296	5.567	16%
	International loans	598	633	651	2%
	Annual total	38.285	32.552	40.326	100%

Reading room loans are requested for one-day use exclusively in the library building. A large part of these loans are associated with RIT student activities in the context of in-library exercises.

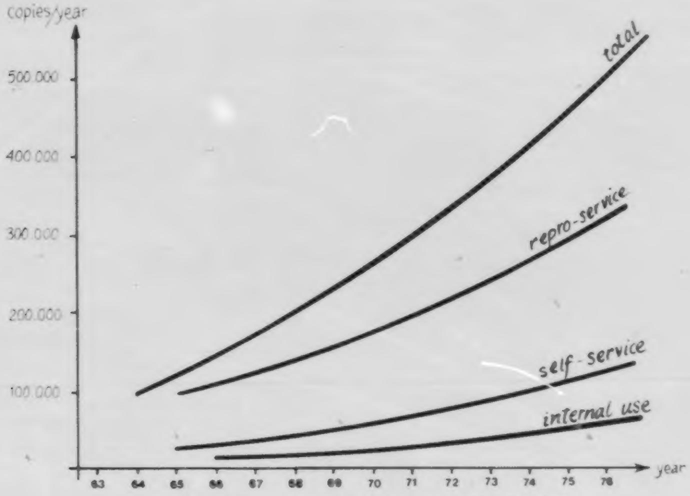
Home loans are requested for use outside the library by customers from the Stockholm region. RIT staff and students can take home loans without any formalities. Representatives of industrial libraries in Stockholm are permitted to take home loans in the name of their organisation. Other library users must register with a formal guarantee covering their home loans. (These or similar procedures are applied by most official research libraries in Sweden).

Inter-library loans within Stockholm are circulated between research libraries in the Stockholm area within the framework by regular cooperative transport service. This service also includes transports to and from a joint depository for less frequent literature, which is situated about 50 miles northwest of Stockholm.

Inter-library loans outside Stockholm are sent by mail to libraries in educational, scientific and industrial organisations.

International loans are sent to scientific libraries in other countries. The major part goes to our neighbour countries in Scandinavia.

Reproduction services offer the following types of reproduction: electrostatic photocopies (now the absolutely dominant product), photographic reproduction and microfilm.



Development of photocopying at RITL

> Microfilm is very little used after the introduction in 1962 of electrostatic photocopies. Before 1962 about 40.000 exposures of microfilm were produced which in 1965 had gone down to only 2.000. A similar development is apparent for the photographic reproductions and enlargements. In the same period they went down from 30.000 to 4.000. Total production of electrostatic photocopies in the year 1975 was about 450.000 pages. As mentioned before 50.000 volumes were taken out for reproduction which means about 60 per cent of the total use of the collections. This should be compared with the 1962 figure of about 10 per cent.

The reproduction service department of the RIT Library now (April 1978) operates two IBM Copier II machines which have been found to be the most adequate from a functional and financial point of view for the overwhelming majority of jobs requested. In the entrance hall a Xerox 3100 Copier is available to the public for self-service. Another Xerox 3100 is available for internal use by library staff. In the reading-room a 3M reader-printer and 3M readers with exchangeable optics are available for use of microfiche. Also a few portable microfiche readers have been acquired.

Pricing policies for photocopying services

It is well recognized that modern photocopying technology has brought about radical change in reading habits in R&D. The volume of photocopies from journal articles has in fact grown to the extent as to give rise to worries in the publishing sector. Although no comprehensive data seem to be available for a reliable assessment of the process, it seems likely that some kind of copyright regulations will have to be introduced to control the future development, (see e.g. the report on *Copyright Law Revisions* to the 94th Congress (94/1476, Sept 3, 1976)).

From the aspect of library management it is undeniable that photocopies in lieu of loans greatly improve the availability of material of current interest. Further, the material is less exposed to wear damage.

Work on the registration and control of loans and on dispatching is considerably reduced. Therefore we are much in favour of an increased use of our reproduction services, which give faster and more economic response to user requirements than ordinary loan service. This is valid in particular for interlibrary requests, where a complicated administrative procedure can be considerably simplified.

On the expense side one has to take into account staffing of copying services and book keeping, and the rental or purchase of equipment.

Considering the structure of photocopying requirements from library users, we have, in the period 1973-78, found the IBM Copier II to be the most adequate equipment. The present contract is based on a minimum average usage of 11.000 copies per month at a price of 0.16 Sw. Cr. per copy. This price includes pigment and service costs but not paper. Further copies are produced at 0.09 Sw. Cr. per copy. Since library customers as a rule only request one copy of each original page, this rental policy is preferable e.g. to the Xerox 7000 system, which is oriented towards the production of small editions, in the order of 10 - 50 copies of each original. So far we have tried to keep the pricing at a level that makes the service self-supporting to a reasonable extent. At present (1978) the following rates are applied

1-5 copies	7.50 Sw. Cr.
6-10 copies	15.00 Sw. Cr.
11-20 copies	25.00 Sw. Cr.

were the price includes mailing by cash on delivery. (The price for single copies picked up at the counter is 1.25 Sw. Cr.) For RIT staff or RIT institutions a general price of 0.60 Sw. Cr. per copy is applied irrespective of quantity.

We apply reduced prices for copying services to users who prepay a certain minimum amount to a personal or institutional account. This arrangement also includes the condition that the library can convert loan requests into reproductions within the limit of ten pages. Following current practice in library relations the RIT Library may also send photocopies as response to loan requests from other scientific libraries. In this case reproduction is free of charge for requests from public libraries and government financed libraries and for requests from institutions within education and research. The volume of such copies free of charge was, in 1975, about 40.000. The rate for self-service copies is 0.60 Sw. Cr. (1978) irrespective of the number of copies.

Books and photocopies from other libraries

The library requests loans from other libraries for its own customers. The total number of these requests is about 4.000 per year. They result in about 2.000 loans and 10.000 pages of photocopies. This includes international loans (100-200 per year).

International requests for reproduction are not included in these figures. More than 90 per cent of such requests (about 900/yr) are transmitted by telex to the British Library Lending Division. These result in about 5.000 pages of photocopies.

Telex service

Telex is mainly used for inter-Scandinavian correspondence between libraries. The library receives about 2.000 requests by telex. 90 per cent of these requests come from Scandinavian libraries (Denmark, Norway and Finland). About 1.000 requests are sent from us to libraries outside Sweden (of which more than 90 per cent to BLLD). Telex communication turns out to be a great help in handling long distance interlibrary relations quickly and reliably. It should be mentioned that our telex installation is frequently used by RIT staff for non-library communication.

Impact of documentation service

The library has pioneered in Sweden (since 1967) in developing an extensive computer-based service, both with regard to current awareness (SDI) and retrospective search (ESA/RECON, Frascati). A prerequisite for a successful documentation system is a well-functioning and comprehensive library as a basis for back-up service. In later years the RIT Library has developed its acquisition policy with such requirements in view. Also the lending department has got used to handling computer-produced bibliographic lists generated in response to individual profiles. The documentation center now serves 2.000 customers directly and as many indirectly through connected services. This activity has given rise to a sizeable increase in library use and in interlibrary transactions.

About 70 per cent of the requests originating from computer-produced bibliographic lists can be satisfied through original documents and photocopies made available through the library system described. The remaining 30 per cent generally consist of technical reports or of articles in (published or unpublished) conference proceedings. At least we can in most cases supply a copy of an abstract or other source of the record retrieved by the computerized information service.

The annual number of requests generated by our documentation services is about 25.000, which is approximately 20 per cent of the total number of loans requests (125.000) to the library. It should be noted, however, that many requests of this kind are hidden in the bulk of the ordinary ones which have first been processed by some other library instead of being sent to us directly.

Statistical summary

		1973/74	1974/75	1975/76
I	Number of visitors			
	RIT	26.990	25.525	28.361
	Other	11.053	9.935	10.019
	Total	38.043	35.460	38.380
II	Number of requests handled	111.000	114.000	125.000
a)	Satisfied requests			
	Loans[*]	38.000	32.500	40.000
	Repro (vol's)[*]	46.000	46.000	50.000
	Interlibrary loans[o]	2.000	2.000	2.000
	Interlibrary repro[o] (vol's)	2.000	2.000	3.000
	Interlibrary referrals	17.000	26.000	23.000
	Total satisfied requests	105.000	108.500	118.000
b)	Non-satisfied requests	6.000	6.500	7.000
III	Reproduction (pages)			
	Repro Service	230.000	260.000	295.000
	Self-service	100.000	110.000	120.000
	Internal use	40.000	40.000	40.000
	Total	370.000	410.000	455.000

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[*] from own collections

[o] from other collections channelled through RIT loans department

NON-SATISFIED REQUESTS

John Linders

Scientific libraries in Swedish institutions for research and higher education traditionally aim at satisfying all requests for scientific literature. This principle is valid for requests from university staff as well as from external customers. Swedish research libraries are linked in an informal co-operative network which in practice generates a common pool for customer services. An efficient tool for handling requests and for addressing them to the right sources is the union catalogue of foreign acquisitions. (The on-line union catalogue maintained within the LIBRIS computerized library network is now coming of age and is beginning to yield some useful results.) Some specialized libraries, for instance the RIT library, have access to inofficial catalogue information about collections in industries and institutions, which do not report to the official catalogue. There exists also an entire spectrum of specialized catalogues giving information about different collections of periodicals, for instance in technology (LIST TECH produced by RITL), medicine, biology, agriculture, economy and law. Some of these catalogues cover collections also in other Scandinavian countries.

The problem of non-satisfied loan requests is certainly not new. For a recent Swedish discussion we might refer to an article by L-E Sanner (Tidskrift för Dokumentation 27(1971)47-50) where various aspects of requests that cannot be immediately satisfied are considered. Most frequently the requested document is either out on loan or it is not available in the library's own collection but elsewhere.Some of the requests are of course incompletely or inadequately stated and must be returned for revisions. When the most common sources of delay have been considered (normally leading to retrieval of the document requested) a residual lot of about 10 per cent of all requests remains as non-satisfied "of a higher order" (as it were).

We will here only try to make some further remarks on ultimately non-satisfied requests received by RIT library during a short test period (7 Jan-6 Febr 1976). The total number of registered requests received by mail during the period was 9.083. Requests submitted personally by library visitors are not included in the investigation. Experience over the last year from the operations of our lending division show that about 72 per cent of the annual sum total of requests was satisfied by RIT library and 22 per cent by the inter-library network to which we are connected (the figures refer to the fiscal year 1974/75). From this follows that about 6 per cent of all requests are left non-satisfied.

In the sample of 9.083 requests included in our specific investigation the number of non-satisfied requests was 364, or about 4 per cent. These 364 items can be roughly classified as follows:

Books	275	76%
Periodicals	55	15%
Technical reports	32	9%

percentages refer to the subsample of nonsatisfied requests.

A first observation is that the deficiencies of the Swedish library system concern primarily literature in book form. Periodicals are reasonably well-accessible, particularly if the BLLD is included in the library network. This statement needs qualifications, borne out by a more detailed analysis of the material. We do, however, not claim to present any accurate or definitive result in this brief note. The aim is to find out some general trends and to point out some of the central problems concerning non-satisfied loan requests:

A: Many requests remain non-satisfied because bibliographic indications given are insufficient for identification of the item even after hard work by library staff. It is also quite clear that many requests refer to more or less periferal literature where satisfaction would most probably not make any difference to the requestor. The validity of this statement is unfortunately extremely difficult to measure, mainly since we are concerned with a non-quantifiable subjective estimate which (to make things even more difficult) is also variable with time and with other contextual factors.

B: Another group of requests concerns books published within less than 6 months before the date of request. Such books can often not be traced in any library catalogue since they are not yet registered or even not yet ordered. In our investigation, about 16 per cent of the non-satisfied book requests relate to recently published books (1975). The introduction of MARC-records in the LIBRIS file will alleviate this dilemma of tracing (unsufficiently defined) requests, but it may at the same time increase the frustration of locating literature that is not immediately or even mediately available.

C: References to literature generated by computer-based documentation services give rise to some special problems.

In the material investigated, the number of such requests is 1.946 (about 22 per cent of the total). Here one cannot speak of non-satisfied requests in the same meaning as in connection with ordinary requests. There exists namely always the possibility of delivering copies of the abstracts which are the basis of almost all computerized reference data bases. One may therefore speak of a kind of "partial satisfaction". Most of the requests partially satisfied in this sense refer to technical reports, patents and conference proceedings which generally can only be made accessible through special channels. In some cases it is only possible to give a general reference to some depository library, information centre, clearing house or other organization for sale of documents. In many cases the material asked for might in the end be made available only six or even twelve months after the date of request.

It should be noted that the present situation is in a way inconsistent. Computer-based services create in some meaning an artificial demand for documents. Many customers have not yet acquired sufficient experience in evaluating documental information communicated to them through the computer-based system. Frequently there is no relation between the potential value to the requestor of a particular document, and the real cost associated with the procedures involved in its acquisition. Therefore a more realistic price policy should be introduced in connection with computer-based information services, designed to eliminate unnecessary requests. Otherwise there is a risk that features which already tend to create an overload of the whole system will accumulate faster than any remedies can either be found or financed.

THE RITL INFORMATION AND DOCUMENTATION CENTRE - Decentralization and Systems Development

by Roland Hjerppe

1. Introduction

The Information and Documentation Center (IDC-RITL) is a department of the Royal Institute of Technology Library. IDC is however to a large extent financed by grants for R&D projects and for commissioned work. SINFDOK, the Swedish Council for Scientific Information and Documentation, is the major sponsor.

The IDC has, since its inception in 1967, concentrated efforts on

1) developing systems for computer-based information services,
2) organizing and offering information services based on these systems,
3) evaluating and improving the services,
4) analyzing the needs of different user communities, and developing methods for the marketing of information services, and
5) training of intermediaries and end-users.

Scientific and technical information systems and services, STI/SS, and their administration are seen as forming an integrated whole, which includes data bases, search systems, user contacts and training, profiling, output, and delivery of full-text documents.

A major characteristic of the activities of the IDC has been the mixture of R&D-work and regular services. New STI/SS have continously been developed, implemented and operated while services to a large user group have been maintained. This policy has of course been both frustrating and rewarding. It is, however, one that can keep the services offered competitive and viable in a rapidly changing environment.

In the time up till 1973 the main emphasis was on developing, implementing and providing SDI-services. Starting from scratch in 1967, considerable volume had been attained by 1973, current awareness services were provided from 15 data bases fro approximately 1200 users. About 1.2 million references were processed and disseminated annually. Retrospective search services were introduced in 1972 following the installation of a high-speed terminal, connected by a leased line to the ESA/RECON system. The ESA center located in Darmstadt, Germany, was transferred in 1973 to Frascati near Rome, Italy.

The activities and accomplishments of the IDC are amply documented in articles, conference papers and project reports.[1]

2. Major trends

When seen somewhat in retrospect the period of July 1973 - June 1976 can in many respects be characterized as a period of transition. However, a presentation cannot be made by a simple step-by-step account of a logical "evolution", since the different activities are indeed closely connected to each other. An attempt will here be made at elucidating the activities in terms of two central themes, *viz.* 1) *evolution of services* and 2) *contributions to systems development.* These themes can be briefly presented as follows:

1) The information services of the IDC are in a phase of transition *from current awareness* (SDI)services, towards *interactive* (retrospective) services. A corre-

lative transition comes through the process of *decentralization*, from an isolated STI/SS-organization with centralized user contacts and service delivery, towards an element in distributed, multi-level national and international service networks.

2) Systems development and implementation efforts for the batch-oriented SDI-services have culminated. Interactive systems are ascending on a national and international scale. Among other things, a new system for on-line retrieval, resulting from a major research project,[2] is now being tested for implementation.

In discussing the two central themes we will explicitly or implicitly touch on two further trends which are associated with the two themes mentioned and not easily separable from them:

3) The role of the IDC is changing, from developing and implementing its own systems, and giving services based on them, towards the function of a "center of excellence" with its main activities in education of end users and intermediaries,[3] referral activities, commissioned use of other complementary services, and research and cooperation on the national and international levels.

4) The environment is expanding, from a scene dominated by libraries in support of science and technology, to embracing a larger sector of users representing more varied organizational settings and information needs.

3. Services and roles

3.1 Current awareness services and information officers

The SDI-operations have been a predominant feature of the services offered by IDC. A service and its actual mode of operation are always based on a number of choices, not all of which are made consciously, some even being considered as evident conditions or assumptions. One of the fundamental questions for the organization of information services is whether they should be based on intermediaries or not. Equally convincing arguments can be put forward for both cases.

The IDC has, originally somewhat unquestioningly, developed and operated a current awareness service in which intermediaries, information officers, have a key role. The principal arguments for maintaining this state of affairs are:

a) Usually there is only a low motivation to be expected among end-users to learn all the details of operating an STI/SS. At its best, a search does not yield directly useful information (texts) but pointers, bibliographic references, to possibly relevant literature. The learning efforts needed are therefore often perceived as unjustified compared to the uncertain prospects of really important "hits".

b) Professionals will usually get better results than amateurs. Prerequisites for good results are thorough knowledge of 1° the information sources, their coverage and organization, 2° systems for subject description, and 3° the operation of the processing system, its rules, possibilities and limitations. Furthermore, a factor improving the prospects of success is experience and continuous practice, which is not easily compensated by other qualities.

Information officers transform information needs (verbalized by the users) into a form that can be processed by the system. The effectiveness of this transformation is critical for the entire service. A first stage involves understanding the information need expressed. The end user often has preconceptions (mostly vague or even faulty) of the information system, and he will unconsciously adapt a verbalization of his information needs accordingly. Further, the needs expressed usually give only some aspects of a larger complex of needs. Also, the information requested is often in reality subject to many restrictions and boundary conditions. All these problems cannot be made explicit at once, but they may be perceived and conceptualized in the course of a dialogue between user and information officer, and later on by a continuing feed-back process.

A first requirement on information officers emphasized at the IDC is that they should have an academic degree in science or technology, the subject fields primarily covered by present services. Only on the basis of a common conceptual framework can a true communication and understanding between the information officer and end user be ensured.

The information officers of IDC have all been educated and trained at IDC, since there is no other education of this kind available in Sweden. This process takes the form of apprenticeship, partly because of lack of proper documentation (due to the constantly evolving systems) and partly because of the character of the work. This training procedure has enabled the IDC continually to introduce new colleagues to the work and thereby to maintain a high level of continuity and efficiency in the services.

3.2 Economics of current awareness services

Economics, however, are another matter. The services of the IDC were given at a loss, i.e. the income from the subscription charges did not recover the costs. They were, as matter of fact, never meant to, since the service was given as a part of a research project and was not designed to be a self-financing operation. The question of whether information services should be charged for (in contradistinction to library services, which traditionally are free) or even should be economically self-supporting, is a matter of policy which will not be considered in this context. Suffice it to note, that there seems today to be a fair consensus on the view that there should be some fees on information services. Opinions on the proportion of costs that should be covered by the users vary widely.

Of the three major cost elements of the services, i.e. computer time, materials and personnel, the last one dominates at IDC. This element is directly proportional, albeit stepwise, to the utilization of services, since each information officer can handle only a limited number of requests.

Consequently any large-scale growth in the utilization of the service in a centralized form, from the 1200 users in 1973 towards several thousand, (maybe ten thousand) potential users in Sweden or Scandinavia, would require a growth of the service organization not to be envisaged without heavy continuing subsidies.

The alternatives at this stage were a) to terminate services, b) to continue on the same scale and in the same mode but in an institutionalized form rather than on an *ad hoc* basis, and c) to attempt to eliminate the obstacles to extended services by developing new modes of operation to meet user needs.

Alternative a) was not acceptable since the services have become accepted in wide circles as a necessity for coping with the flow of information on results and applications of scientific and technical research. The obvious circumstance that Sweden contributes to global research and development only in few areas and with limited impact, further enhances the need for instruments for getting access to information even in areas where experts are not easily available. Alternative b) was also perceived as a rather unsatisfactory compromise since the service would either decay or face the earlier mentioned impasse, if rigorously applied.

The way chosen was to relinquish some of the control of the system and to decentralize. By accepting "external" information officers as intermediaries and providing access to the system for them, the total utilization could be permitted to grow without a corresponding growth of IDC and its internal costs. Seen from a national perspective this is simply a redistribution of subsidies, not a reduction, but for many reasons this solution was considered feasible. The alternative of opening the system to the end user, eliminating the intermediaries (information officers) and charging the end users with the task of learning to use the system, was not (and is still not) considered viable for the non-interactive mode of operation of the SDI-service.

3.3 Decentralization

In the mode of operation that was envisaged, and that is now in the process of implementation, one common system for processing of bibliographic files would be available. Contacts and dialogue with users, profile formulation and modification by feedback would proceed on a decentralized, i.e. regional, local or specialized basis.

Essential to this organization was also the establishment of a close co-operation between the two major information and documentation centers in Sweden, IDC and the Medical Information Center (MIC) at Karolinska Institutet, Stockholm. The two centers had evolved in parallel and largely independently of each other. Contacts resulted, without much friction in an agreement on coordinated SDI-services based on the software package (EPOS-VIRA) developed at IDC-RITL.

Major obstacles to the implementation of the decentralization plans were e.g. that:

- The "external" information officers would have to be trained, not only in the actual operation of the EPOS-VIRA-system but also in various basic topics such as scientific communication, indexing and classification principles, promotion of services etc.
- Very little documentation of systems, routines, rules and conventions was available. No manuals or handbooks fit for use in education did exist.
- The various bibliographic files included in the SDI-services were, for "historical" reasons, not processed in a compatible, consistent manner.
- The security, safeguard, reliability and control routines were adapted to relatively closed, in-house operations.
- The administrative routines were likewise adapted to the prevalent situation.
- There were very fundamental differences in the modes of operation of IDC and MIC.

Considerable efforts have been spent since 1973 on overcoming these obstacles, by concerted systems development, by intense work on documenting systems and routines, by writing handbooks and manuals, by preparation of curricula, by presentations and courses, by functional restructuring, by extensive co-operation with MIC and other data centers - in brief by adapting to new rules and new functions.

The educational activities at RITL are presented in some detail in ref.[3] and will thus not be elaborated on here.

3.4 Interactive (retrospective) search

In parallel with the transition towards decentralization of current awareness services another development has taken place. In 1972 the IDC was connected to the interactive retrospective information retrieval system of ESRO (today ESA, European Space Agency), called RECON.

Although this connection was established as a part of a separate project, the activities were integrated into the operations of the IDC. Therefore, all the information officers at IDC regularly utilize the ESA/RECON system on behalf of users. Since all the information officers have different'professional background and since most of the files available on ESA/RECON also are processed by IDC in the SDI-service, the ESA/RECON system could immediately be utilized with full efficiency. This connection marked the beginnings of large-scale interactive retrospective services in Sweden for science and technology. A corresponding service for medicine via the MEDLINE-system was introduced, also in 1972, by the Medical Information Center, MIC.

The retrospective services available through ESA/RECON were a major addition to the services of the IDC, in complement to the SDI-service. In October 1974 a high-speed terminal, similar to the one used at IDC, was installed at Lund University Library, LUB. In September 1975 contacts were established with System Development Corporation (SDC), Lockheed Information Systems (LIS), and MIC for access to their systems ORBIT, DIALOG and MEDLINE respectively.

In utilizing these systems, IDC was performing an intermediary role, taking advantage of experiences gained in information retrieval techniques and knowledge acquired of bibliographic data bases. The retrospective services offered were, however, centralized in the sense that access to the systems, especially RECON, was channelled through IDC. During the spring of 1976 a mini-computer which would make possible a dial-up service to ESA/RECON was installed at IDC. Up to four users, equipped with teletype-compatible terminals, can now be connected simultaneously to Frascati from any point in Sweden and Finland.

The introduction of the dial-up node to RECON was thus another phase of the decentralization process initiated in the context of SDI services. Problems of management, administration and education, similar but not identical to the ones already encountered, were again recognized and solved.

4. Systems development

4.1 General principles

The SDI service was originally started in close collaboration with the library of AB Atomenergi (The Swedish Atomic Energy Research Establishment). For a long time, until the fiscal year 1972/73, all processing was done at the computing center of AB Atomenergi, with a software system called ABACUS.[4] A changeover was initiated during 1972/73 to a completely new set of software modules and at the same time to a new computer center, the Stockholm University Data Center, (called "QZ" for obscure reasons). The ABACUS programmes had been processed on an IBM 360/30F under DOS while the new computer was an IBM 360/75 under OS.

4.1 Software package for SDI

The total software package used for an SDI service can be regarded as consisting of five modules: reformatting, profile handling, searching, listing and administration.

The first module is used for transforming the different bibliographic files, which differ in almost all respects, such as physical and logical structure, rules used for bibliographic description, and content.

When several different bibliographic files are to be processed, a policy decision must be taken at an early stage on whether a specific search programme for each file that can process the file in its original form (as received from the producer) should be used, or whether a general search programme requiring reformatting of each one of the different files into one common format would be preferable. The advantage of the first solution is that it eliminates the pre-processing (reformatting), while the disadvantage is that the affiliated profile handling programmes also have to be different, thus complicating profile formulation for the same query on different data bases. For the second solution the advantages and disadvantages are reversed. At IDC the second solution was chosen from the beginning and has since been maintained, since the advantages dominate when an increasing number of different files are added to the SDI search service.

The second module (for profile handling) is used for adding new profiles and modifying old ones. The design of this module, which is closely connected to the third module, has a great impact on the work of the information officers in profile formulation.

The third module (the search programme) is divided into two parts, one for profile selection and one for the actual searching. When processing many different files there will be two decisions to make for each query:

1. Which files should be searched?
2. Should there be different profiles for searches on different files?

If all queries are matched against all files and all queries are represented by only one profile each, there will of course be no problem of profile selection. Since this is neither an economic nor expedient way of running IR systems there is a need for a programme that, for the processing of a specific file, selects the profiles designated to be searched against that file. The solution first adopted by IDC in the ABACUS programme (and later modified), was to operate one profile for each query, but to match each query against different files.

By means of the fourth module (the listing or printout programme) the hits from the search programme are processed for printing and are subsequently printed. The fifth and last module produces various kind of statistics from the operations of the preceding modules.

The major phases of system development at IDC are indicated in table 1, and will be briefly expounded on in the sequel.

4.2 Software developments at IDC (1971-73)

In September 1971 a changeover was started from ABACUS and the computing center of AB Atomenergi to the first generation of the VIRA programme[5] and to the computing center QZ. The associated profile handling programme, PROSA, incorporated a change to the effect that for each query a particular profile should be supplied for each file that was searched. A major addition to the profiling facilities was the possibility of weighting the search terms and thus of ranking the output in descending order of relevance. This in turn made it possible to introduce a cut-off level while maintaining the principle of using Boolean logic for the search conditions.

The format used was the original ABACUS format and the listing was still done at AB Atomenergi. The transition was gradual and table 1 does not show in detail when

			SEARCHMODULE			
PHASE	FORMAT	PROFILE-HANDLING	PROFILE-SELECTION	SEARCH	LISTING	STATISTICS
1 Sep-71	ABACUS	PROSA	PREVIRA-I	VIRA-I	TAVLA	TERM STAR 5 SEARCH
2 Nov-72	- " -	EPOS-I no calls	PREVIRA-II modified for EPOS-I	- " -	- " -	- " -
3 Mar-73	- " -	- " -	- " -	- " -	GETREF REFOUT	STAR 5 SEARCH
4 Fall-73	- " -	EPOS-II calls	PREVIRA-III modified for EPOS-II	VIRA-II	- " -	- " - + HIT PROF DATA BASE
5 Jul-74	- " -	- " -	JOCKE-I	VIRA-III	SOLO-I	- " - - " -
			new input routine and new search logic in VIRA entail total reprogramming of routines for profile selection, JOCKE-I, and listing, SOLO-I.			
6 Interim-phase from Sep-74	- " -	EPOS-III modified for KOMPOST	JOCKE-II modified for KOMPOST	- " -	SOLO-II general data base controlled listing	- " - - " -
7 Feb-75	KOMPOST	- " -	- " -	VIRA-IV modified for KOMPOST	- " -	- " - - " -
8 Oct-76	- " -	EPOS-IV modified for PROTECT	- " -	- " -	- " -	- " - - " -

TABLE 1:THE MAJOR PHASES OF SYSTEMS DEVELOPMENT AT IDC-RITL

each file was adopted to each new module. This is however only of historical interest. The main point is that the system development was complicated by the requirement that operating conditions had to be maintained, which would have been difficult even if system development had not been combined with a simultaneous transfer to another computer. The statistics produced from the searches included the frequency of the different terms generating hits for each profile, for every search of a file distributions of the number of references printed per profile, and notice of the profiles that had experienced a too large response (or none) during five consecutive searches of a file.

(This version PROSA-VIRA was adopted in 1972 by Centre National de la Recherche Scientifique, CNRS, by their Centre de Documentation, CD, and their Centre de Documentation Sciences Humaines, CDSH, for providing SDI-services based on respectively Bulletin Signalétique and Bulletin Signalétique Humaine).

In November 1972 a new profile handling programme, EPOS,[6] was implemented. One main new feature was the ability to copy existing profiles or parts of them into new or other existing profiles, thus facilitating the utilization of the intellectual effort spent in designing the old profiles. Another important innovation was the possibility of using a terminal for input of profile information, combined with the technique of maintaining the file of profiles on an active disk. The profile selection programme had of course also to be modified since the file of profiles was completely changed.

In March 1973 a new listing programme was implemented which made it possible to transfer the printing to the same computing center where searches were performed, i.e. QZ.

During the fall of 1973 a new generation of the search programme VIRA[5] was introduced, whereby a planned feature of EPOS, the call facility, could be added. This operation enables one profile to call upon the results of another profile and subsequently to modify it. Hierarchies of profiles can thus be built and subprofiles be defined that can be used by many profiles. This feature thus complements the copying facility, allowing many profiles to be easily modified by changing one subprofile, common to them all. The profile selection programme was modified accordingly since both the profile handling and the search programme had been changed.

A new statistical programme was also introduced which, for each query, logged the files that were searched and for each file cumulated the number of searches, the number of hits, the number of references printed, the number of searches giving more references than a given limit and the number of searches with no hits. This programme is used to keep statistics on the number of references printed per file needed for royalty accounting. In the quarterly printouts of statistics it can be discovered whether a file should not be used for a specific query because it produces no result or whether a profile should be changed because it produces too much.

4.3 Software developments at IDC after 1973

In July 1974 a completely new generation of the search programme VIRA[5] was implemented, resulting in improved reliability and better economy. A new programme for profile selection and a new printout programme were also introduced.

Then, in an interim phase from September 1974 to February 1975, a new reformatting programme KOMPOST[7] was introduced, calling for a modification of all the other programmes. Since this could not be done at the same time for all files, two different sets of programmes had to be maintained and operated during the interim phase.

Since the ABACUS reformatting programmes had been developed rather incoherently there was not much consistency in the reformatting of different files. There was thus an acute need for a common consistent and comprehensive format that could accomodate all the different files and their peculiarities. Another requirement on a "universal" format to be used both for processing and archival storage was compactness. The KOMPOST format satisfies these diverse needs and has alleviated the work of the information officers considerably while at the same time giving them greater freedom of action. It was also a convenient moment to introduce a general listing programme, adapted to each file while providing normalized lay-out.

From the very beginning it was realized at IDC that a prerequisite for success of the SDI-service was the availability of the full text of documents corresponding to retrieved bibliographic information. For this reason a routine was devised for ordering photocopies of documents referenced in the SDI-output. The customer had only to send a note to IDC with his subscription number, the date of the list and the serial number of the reference. At IDC a copy of all outputs was kept and used to identify the request and to complete a standard order form for the library. The transcription would therefore be done by trained personnel and errors and misunderstanding would normally be avoided. The printout duplicates at IDC, which were used also in the process of profile modification, were microfilmed 3-4 times annually, so that IDC has complete records on the output delivered since 1967. However, as the number of orders grew considerably, sufficient capacity for this processing could not be allocated, which resulted in unreasonable delays.

In June 1976 a new listing programme, printing the records on cards instead of lists was introduced. The idea was to give the user a convenient semi-automatic means of ordering a requested document, by simply sending in the corresponding card to the library.

At the same time a new routine for transferring the output of SDI searches directly to microfiche by the use of COM-technique was implemented. The cards have eliminated the transcription work, while the COM-fiches have eliminated both filing and subsequent microfilming of duplicates. The COM-fiches can also be duplicated at a very low cost and be distributed to the "decentralized" information officers who thereby (since the cards are sent directly to the end users) can monitor the performance of "their" profiles.

In October 1976 the profile handling programme EPOS was modified so that a special security and integrity protection programme PROTECT[8] could be implemented.

As long as all profiling and profile input was done at the IDC, there was no need for special security protection. As a result of the process of decentralization carried through, many different individuals from many organizations might want to have access to the file of profiles. In this situation it was imperative to ensure that one should not have the possibility, by accident or malice, to read or change the profile information of others, since it can in many cases by highly confidential. In the PROTECT programme a hierarchy is defined and every profile designer can decide for any of his profiles, to whom the profile should be accessible, and in which form.

(CNRS in France, that had been using an old version of the software, started in 1976 to adapt this "final" version of EPOS-VIRA).

At the time of writing (July 1977) a user and address file is in the process of implementation. It will be used for operations like invoicing of subscriptions and mailing of search results, which have so far been done manually.

In parallel with system developments, which have in this context been described from a functional point of view, a separate R&D project called 3RIP[2] is pursued. One principal objective is to develop a system for interactive retrospective search on large textual files.

There are many lessons to be learnt from this experience of developing large-scale computerized documentation systems. The most important one is that it is basically an R&D-effort that should not be to rigidly planned, since objectives evolve "organically" with experience. The heuristic element certainly may cause some detours, but this is largely compensated by leaving more options open to be used when found to be adequate. Further, the concept of constructive redundancy should be kept in mind. Developments in parallel may seem to be a waste but they may soon turn out to render means for catching up with developments that would otherwise remain unobserved due to preoccupation with operations of regular services, regarded today as satisfactory but maybe tomorrow as obsolete.

5. Looking ahead

Among the developments that are planned for the IDC, and therefore can be forecast with some certainity, are the following:

1) increased efforts in user education;
2) referral and brokerage services in an international network of services;
3) assistance to developing countries in setting up and utilizing STI/SS;
4) text-processing outside the limits of bibliographic data;
5) integration of library automation and information services.

In the near future IDC will continue to expand its educational programme for intermediaries and for students of RIT.[3] IDC is actively participating in EUSIREF, European Scientific Information Referral, a co-operation programme within EUSIDIC (European Association of Scientific Information Dissemination Centers). IDC is also acting as an information broker in the utilization of SDC/ORBIT, LIS/DIALOG and also smaller and more "exotic" services. This part of IDC activities will be growing as a consequence of the proliferation of information sources and services. A major programme is concerned with co-operation with Portugal on introducing modern documentation methods and services.[9] A similar programme is in the process of being defined in co-operation with authorities in Tanzania.

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Kungl. Tekniska Högskolans Bibliotek
Royal Institute of Technology Library

IDC — The RITL Information and Documentation Center
DATA BASES INCLUDED IN THE SDI SERVICE (May 1978)

ABIPC*	Abstract Bulletin of the Institute of Paper Chemistry (USA) contains about 13 000 references per year, to articles, conferences, patents etc. in the field of pulp and paper chemistry and technology. 11 tapes per year are issued. The corresponding printed publication has the same name and periodicity.
AIDS*	Abstract Information Digest Services from the Forest Products Research Society (USA) contains about 7 000 references to articles from approximately 180 journals, reports and books in the field of wood technology. The tapes are searched in cooperation with the Swedish Forest Products Research Laboratory. Searches are performed twice a year on tapes covering the period from 1947 to present. No corresponding printed publication exists but the file is available on microfiche.
BIOSIS**	BIOSIS Previews from the Biosciences Information Center (USA) contains references to articles, symposia, reports etc. in the field of biology. The data base is divided into two parts, one of which corresponds to the printed publication, Biological Abstracts and the other to the Bioresearch Index; About 250 000 references a year. The tapes are searched three times a month.
CACON* **	Chemical Abstracts Condensates from Chemical Abstracts Service (USA) contains yearly about 380 000 references to articles, conference papers, reports, patents etc. in the field of chemistry. The tapes are searched weekly. The printed publication, Chemical Abstracts is issued weekly.
CBAC**	Chemical-Biological Activities from Chemical Abstracts Service (USA) mainly contains biochemical references included in sections 1-5 and 62-64 of Chemical Abstracts Condensates. What makes CBAC especially interesting is its depth indexing and the number of different fields. The tapes cover 40 000 references a year and are searched twice a month.
COMPENDEX*	Computerized Engineering Index from Engineering Index Inc. (USA) covers the literature in engineering and technology and biotechnology as well. Primarily it covers articles and conferences but monographs, patents and standards are also included. The tapes contain about 90 000 references a year and are searched monthly. The corresponding printed publication is called Engineering Index Monthly.
CP*	Conference Papers Index from Data Courier Inc. (USA) contains yearly about 120 000 references to papers presented at technical, scientific and medical meetings. The tapes are searched once a month. The printed version, Current Programs is issued monthly.
CT**	Chemical Titles from Chemical Abstracts Service (USA) contains references to the 700 most important chemical periodicals. The significant feature of CT is its rapid coverage of these journals. The tapes cover about 150 000 references yearly and are searched weekly.
ERIC*	ERIC Master Files from the Educational Resources Information Center (USA) contains yearly about 35 000 references to reports and articles in education and modern educational technology. The tapes are searched monthly and correspond to two other publications: Resources in Education-RIE, which contains reports and Current Index to Journals in Education. Both publications are issued monthly.
FSTA*	Food Science and Technology Abstracts from the International Food Information Service (West Germany) covers articles, monographs, patents, standards etc. in food science and technology and yields about 17 000 references yearly. The printed version of FSTA is issued monthly.
GRA*	Government Reports Announcements from the National Technical Information Service - NTIS (USA) contains about 55 000 references a year covering reports of research sponsored by the US Federal Government in the fields of science, technology and the behavioural sciences. The tapes are searched every other week. The printed publication Government Reports Announcements & Index is issued every other week.
INIS***	International Nuclear Information System from the International Atomic Energy Agency (Wien) contains about 70 000 references yearly to articles, reports, conference papers, patents etc. in nuclear science and technology. The tapes are searched every other week. The corresponding printed publication, INIS Atomindex is issued twice monthly.

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INSPEC*	Information Service in Physics, Electrotechnology, Computers and Control from the Institution of Electrical Engineers (U.K.) in collaboration with the Institute of Electrical and Electronic Engineers (USA). This data base contains yearly about 150 000 references to articles, reports, patents and other literature in the fields specified in the titel. The tapes are searched every other week. The corresponding printed publication is issued under different titles: Physics Abstracts, issued every other week, Electrical & Electronics Abstracts and Computer & Control Abstracts both issued monthly.
ISI*	Science Citation Index Source Data Tape from the Institute for Scientific Information (USA) contains interdisciplinary information from the 4 500 most frequently cited journals in science, technology and medicine. The data base contains about 450 000 references and is searched weekly. The corresponding printed publication, Science Citation Index is issued quarterly
MECHEN*	Mechanical Engineering from the RIT Library (Stockholm) contains 37 000 references a year covering articles, news-items and presentation of new products in the field of mechanical engineering and working of metal. The tapes are searched every other week. No printed version exists.
METADEX*	Metals Abstracts Index Tapes from the American Society for Metals in collaboration with the Institute of Metals (U.K.) contains about 30 000 references a year primarily to articles treating the properties of different metals and metallurgy. The tapes are searched monthly. The corresponding printed version, Metals Abstracts is issued monthly.
PA**	Psychological Abstracts from American Psychological Association (USA) contains about 26 000 references a year to articles, monographs, dissertations etc. in psychology. Current awareness services are available quarterly and retrospective searches are also made.
PASCAL*	Programme Appliqué à la Sélection et à la Compilation Automatique de la Littérature from Centre National de la Recherche Scientifique (INFORMASCIENCE, France) contains 500 000 references a year in the field of science, technology and medicine and corresponds to the different sections of the printed publication Bulletin Signalétique. The tapes are searched every month.
RECODEX***	Report Collection Index from the Research Library at AB Atomenergi (Sweden) contains about 7 000 references a year. Included are those newly acquired reports, standards and patents which are not covered by INIS. The data base covers mainly the field of energy and is searched monthly. No printed version exists.
SSCI*	Social Science Citation Index Source Data Tape from the Institute for Scientific Information (USA) contains about 100 000 references a year to articles and news-items in the field of the social science. The tapes are searched weekly. The corresponding printed publication Social Science Citation Index is issued quarterly.

COMMENTS

* data bases administered by IDC-RITL
(acquisition, contacts with issuing institutions, etc)
** data bases administered by MIC (Medical Information Center).
*** data bases administered by AB Atomenergi.

SDI service via the EPOS-VIRA system is also accessible through the Medical Information Center and through several information centers in the Nordic countries.

SPACE DOCUMENTATION SERVICE

FILES AVAILABLE FOR RETROSPECTIVE SEARCHES THROUGH ESA-RECON

File no.	File name	Supplier	Subject coverage	Time span	No. refs March 1978
1	NASA	National Aeronautics and Space Administration, USA	Multidisciplinary; science/technology; aerospace; materials; electronics	1962-	905 000
2	CHEMABS	Chemical Abstracts Service, USA	Biochemistry; organic macromolecular, applied, physical, analytic chemistry; chemical engineering	1969-	3 040 000
3	METADEX	American Society for metals, USA	Applied; theoretical metallurgy: properties of metals/alloys	1969-	252 000
4	COMPENDEX	Engineering Index Inc., USA	Civil, electrical, mechanical, metallurgical, engineering; electronics	1969-	661 000
5	ECDB	European Space Agency, Italy	Electronic components, includes relevant characteristics with numerical values	current	50 000
6	NTIS	National Technical Information Service, USA	Multidisciplinary; science/technology	1970-	413 000
7	BIOSIS	Biosciences Information Service, USA	Botanary; chemistry; medicine; microbiology; zoology	1972-	1 248 000
8	INSPEC	Institute of Electrical Engineers, GB	Multidisciplinary; physics; electrical engineering; electronics; computers; control; automation	1971-	944 000
9	ALUMINUM	American Society for Metals, USA	Aluminium science, technology, applications	1968-	58 000
10	ISMEC	Data courier, USA	Mechanical engineering; management and production; measurement and control; materials; production processes; transport and handling	1973-	68 000
11	ENVIROLINE	Environment Information Center, USA	Environmental engineering; energy; pollution; resources	1971-	64 000
12	LEDA RETROSPECT	European Space Agency, Italy	References to imagery sensed by the LANDSAT satellites previous year	previous year	32 500
13	LEDA CURRENT	European Space Agency, Italy	References to imagery sensed by the LANDSAT satellites during the current year	current year	19 000
14	PASCAL	Centre National de la Recherche Scientifique, France	Multidisciplinary; physics, geoscience, aerospace; engineering, metallurgy	1973-	1 328 000
15	OCEANIC	Data Courier, USA	Biology; geology, meteorology, oceanography; remote sensing; desalination, pollution; engineering; diving; ships and shipping	1964-	97 000
18	POLLUTION	Data Courier, USA	Air- and water pollution, solid wastes, noise, pesticides, radiation	1970-	51 000

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SDC/ORBIT	(Santa Monica, Cal., US. Connected via satellite)	Science Technology Social sciences Economy	10m refs
LOCKHEED/DIALOG	(Palo Alto, Cal., US. Connected via satellite)	Science Technology Social sciences Economy	12m refs

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APPENDIX IV

INFORMATION SYSTEMS/DATABASES IN THE USA AVAILABLE AT IDC-RITL

LOCKHEED/DIALOG

File No.	DATABASE (supplier)	Online Connect Time Rate $/Hour	Offline Print Rate Per Full Record
	SCIENCE		
10	AGRICOLA (Natl. Agricultural Library, U.S. Dept. of Ag.)	$25/Hr	5¢
5	BIOSIS PREVIEWS (Biosciences Info. Service of Biol. Abs., Inc.)	45	10
2	CA CONDENSATES 1970-1971 (American Chemical Society)	35	8
3	CA CONDENSATES 1972-1976 (American Chemical Society)	35	8
4	CA CONDENSATES/CASIA 1977- (American Chemical Society)	45	16
43	CA PATENT CONCORDANCE (American Chemical Society)	45	12
30	CA SUBJECT INDEX ALERT CASIA (American Chemical Society)	60	12
31	CHEMNAME	60	12
50	COMMONWEALTH AGRICULTURAL BUREAUX ABSTRACTS (Commonwealth Agricultural Bureaux)	65	15
35	COMPREHENSIVE DISSERTATION ABS. (Xerox U. Microfilms)	55	12
58	GEOARCHIVE (Geosystems)	70	20
12	INSPEC-PHYSICS (Institution of Electrical Engineers)	45	10
34	SCISEARCH® (Institute for Scientific Information)	70	10
62	SPIN (American Institute of Physics)	35	10
65	SSIE CURRENT RESEARCH (Smithsonian Science Info. Exchange)	90	20
	APPLIED SCIENCE & TECHNOLOGY		
45	APTIC (Air Pollution Technical Information Center, U.S.E.P.A. and The Franklin Institute Research Laboratories)	$35/Hr	10¢
44	AQUATIC SCIENCE & FISHERIES ABSTRACTS (NOAA)	35	10
23	CLAIMS/CHEM 1950-1976 (IFI/Plenum Company)	150	10
24	CLAIMS/CHEM 1977- (IFI/Plenum Data Company)	150	10
25	CLAIMS/CLASS (IFI/Plenum Data Company)	90	10
57	CLAIMS/GEM (IFI/Plenum Data Company)	90	10
8	COMPENDEX (Engineering Index, Inc.)	65	10
60	CURRENT RESEARCH INFORMATION SYSTEM (USDA)	40	10
69	ENERGYLINE® (Environment Information Center)	90	20
40	ENVIROLINE® (Environment Information Center)	90	20
68	EPB (Internatl. Acad. at Santa Barbara)	60	15
51	FOOD SCIENCE AND TECHNOLOGY ABS. (Intl. Food Info. Service)	65	15
13	INSPEC-ELEC/COMP (Institution of Electrical Engineers)	45	10
77	INTERNATIONAL PHARMACEUTICAL ABS. (Am. Soc. of Hospital Pharmacists)	50	15
14	ISMEC (Data Courier, Inc.)	65	12
32	METADEX (American Society for Metals)	80	12
29	METEOROLOGICAL ABS. (Am. Meteorological Soc. and NOAA)	50	10
63	MRIS ABSTRACTS (Maritime Research Information Service)	35	10
6	NTIS (National Technical Info. Service, U.S. Dept. of Commerce)	35	10
28	OCEANIC ABSTRACTS® (Data Courier, Inc.)	55	10
41	POLLUTION ABSTRACTS (Data Courier, Inc.)	65	10
52	TSCA 1977 CANDIDATE LIST (U. S. Environmental Protection Agency)	45	15
33	WORLD ALUMINUM ABSTRACTS (American Society for Metals)	50	10
	SOCIAL SCIENCES & HUMANITIES		
9	AIM/ARM (Center for Vocational Education)	$25/Hr	10¢
38	AMERICA: HISTORY & LIFE (ABC-CLIO, INC.)	65	15
56	ART MODERN (ABC-CLIO, Inc.)	60	15
64	CHILD ABUSE AND NEGLECT (Natl. Cntr. for Child Abuse & Neglect)	35	10
1	ERIC (Educational Resources Information Center)	25	10
54	EXCEPTIONAL CHILD ED. ABS. (Council for Except. Children)	25	10
39	HISTORICAL ABSTRACTS (ABC-CLIO, Inc.)	65	15
36	LANGUAGE & LANGUAGE BEHAVIOR ABS. (Social Abs., Inc.)	55	15
46	NICEM (National Information Center for Educational Media)	70	20
71	ONTAP	15	n/a
11	PSYCHOLOGICAL ABSTRACTS (American Psychological Assoc.)	50	10
7	SOCIAL SCISEARCH® (Institute for Scientific Information)	70	10
37	SOCIOLOGICAL ABSTRACTS (Sociological Abstracts, Inc.)	55	15
	BUSINESS/ECONOMICS		
15	ABI/INFORM (Data Courier, Inc.)	$65/Hr	10¢
19	CHEMICAL INDUSTRY NOTES (American Chemical Society)	90	20
26	FOUNDATION DIRECTORY (The Foundation Center)	60	30
27	FOUNDATION GRANTS INDEX (The Foundation Center)	60	30
59	FROST & SULLIVAN DEFENSE MARKT. MEAS. SYS. (Frost & Sullivan)	90	20
75	MANAGEMENT CONTENTS® (Management Contents)	55	10
49	PAIS INTERNATIONAL (Public Affairs Information Service, Inc.)	60	15
42	PHARMACEUTICAL NEWS INDEX (Data Courier, Inc.)	65	15
22	PTS EIS PLANTS (Predicasts, Inc.)*	90	50
20	PTS FEDERAL INDEX (Predicasts, Inc.)*	90	20
21	PTS FEDERAL INDEX WEEKLY (Predicasts, Inc.)*	90	20
18	PTS F&S INDEXES (Predicasts, Inc.)*	90	20
87	PTS INTERNATIONAL ANNUAL TIME SERIES (Predicasts, Inc.)*	90	20
87	PTS INTERNATIONAL STATISTICAL ABSTRACTS (Predicasts, Inc.)*	90	20
16	PTS MARKET ABSTRACTS (Predicasts, Inc.)*	90	20
17	PTS MARKET ABS. & F&S ABSTRACTS WEEKLY (Predicasts, Inc.)*	90	20
82	PTS U.S. ANNUAL TIME SERIES (Predicasts, Inc.)*	90	20
83	PTS U.S. REGIONAL TIME SERIES (Predicasts, Inc.)*	90	20
81	PTS U.S. STATISTICAL ABSTRACTS (Predicasts, Inc.)*	90	20

*Available on a six-month trial basis. Permanent service must be arranged through Predicasts, Inc., 200 University Circle Research Center, 11001 Cedar Ave., Cleveland, OH 44106 (216/795-3000)

SDC/ORBIT

DATA BASE CONTENT

Data Base	Science & Technology	Social Science	Business
ACCOUNTANTS' INDEX		X	X
AGRICOLA	X		X
APILIT	X		
APIPAT	X		X
ASI	X	X	X
BIOSIS	X		
Cambridge	X		
CDI	X	X	X
CHEMCON & CHEM7071	X		
CIN	X		X
CIS	X	X	X
COMPENDEX	X		X
CRECORD	X	X	X
ENERGYLINE	X	X	X
ERIC	X	X	X
FSTA	X		X
GeoRef	X		
GRANTS	X	X	X
INFORM		X	X
INSPEC	X		
LIBCON/E & F	X	X	X
LISA	X	X	
MANAGEMENT		X	X
NTIS	X	X	X
PAPERCHEM	X		X
PATENTS	X		X
P/E NEWS	X		X
PNI	X		X
POLLUTION	X	X	
PSYCHOLOGICAL ABSTRACTS		X	
RINGDOC	X		
SAE	X		X
SSIE	X	X	X
TITUS	X		
TULSA	X		X

LIST TECH - a union list of periodicals in science and technology

by Ola Palmaer

In the years 1927-1931 the Royal Swedish Academy of Engineering Sciences published a catalogue of periodicals in the fields of mathematics, physics, chemistry, earth-sciences, technological sciences and architecture.[1] The volume, covering about 4750 full titles available mainly in the Stockholm-Uppsala region, was edited by Hilda Lindstedt, head of the Royal Institute of Technology Library. A high reliability of information was obtained since, for the compilation, RITL-staff had visited all contributing libraries to list their stock of periodicals, a considerable effort begun already in 1921. The obvious purpose of the catalogue was to provide librarians with information for inter-library loans and for a coordinated acquisition policy and also "to give engineers and architects an instrument for searching literature".

Up to the mid-thirties the technical library support in Sweden was largely located in the Stockholm-Uppsala area. Chalmers Technical University Library rather had the character of an institutional library. Only three industrial libraries (Stora Kopparbergs Bergslag, Siwerts Kabelberk and Separator) existed in 1931. The remaining contributing libraries (ca 100) all belonged to institutions of higher education and research.

The foreign prototypes for the catalogue were a "Catalogue of Scientific Periodicals in Canadian Libraries" (1924) edited by G.R. Lomer and M.S. Mackay,[2] and "A Catalogue of Technical Periodicals, Libraries in the City of New York and Vicinity" (1915) edited by A.J. Gates.[3]

Eighteen years passed before a new catalogue of periodicals in any special field was published in Sweden. By then there were several reasons to produce an annually updated list of periodicals in Science and Technology, the principal one being the growth of technological libraries in the period following the war. A diagram of the holdings of current periodicals at the RITL library is indicative of this process.

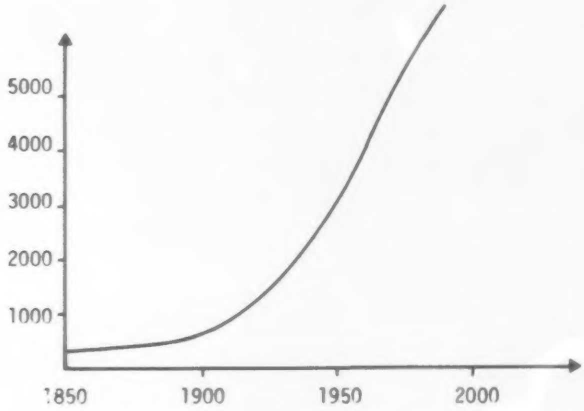


Fig. 1 Holdings of periodicals at RITL

The new catalogue published by the Swedish Society for Technological Information in the years 1949-1957, and by the RITL since 1958, was founded and edited by Carl Björkbom, head librarian at RITL 1946-1963. From 1956 on, it was called LIST TECH. It covers current periodicals and serials in the areas of technology, architecture, industrial management, mathematics, physics and chemistry available in Swedish industrial and research libraries (periodicals in the Swedish language are not included).

Carl Björkbom developed a kind of philosophy of librarianship, based on the idea of an abstract network of library services on the regional, national and international level (although he did not use the term). The central idea appears from the following quotation[6]:

> "Technology is now developing immensely and relevant literature is produced not only in the centers of Western Culture, but literally in all countries of the world. Therefore it is not longer possible for libraries to cover all literature of potential use to research, and so it is not possible for them to fullfill their responsibilities by themselves. Instead, today a close co-operation between different libraries is needed for solving the problems of acquisition.
>
> This co-operation is expressed in the first place by a regular service of inter-library loans. Thereby it is possible to conceive of a second-order library system, a "union library" on the regional or national level. Ultimately a "world library" emerges, incorporating all libraries in the world and in consequence all literature produced."

The titles are in pure alphabetical order according to the first word in the title. Serials published by institutions and where the title is not significant (i.e. cannot be uniquely quoted without stating the institution concerned), are arranged according to the name of this institution. Subtitles are not included where they are not significant.

The co-operation of industrial libraries in supplying information for LIST TECH and in making these collections of periodicals available to the general public is of course a crucial point in the idea of a "union library". There are certain obvious problems of confidentiality involved. The holdings of periodicals within the organisation disclose a lot about the organisation´s aim and activities. Therefore industries are reluctant to have this information released overtly. However, in most cases they agree to participate on the condition that only a few central libraries know the explicit location of a title, whereas the public only is alerted by a general code (I) for "industrial library". This principle has been followed in LIST TECH since 1949. A special key for decoding the I-indications is produced as a computer listing from the LIST TECH file and kept for inter-library loan service only in RITL, CTL and Lund University Library. Up to twelve different I-libraries are recorded for a title. If several public research libraries hold the same title, the I-indications are reduced or completely cancelled.

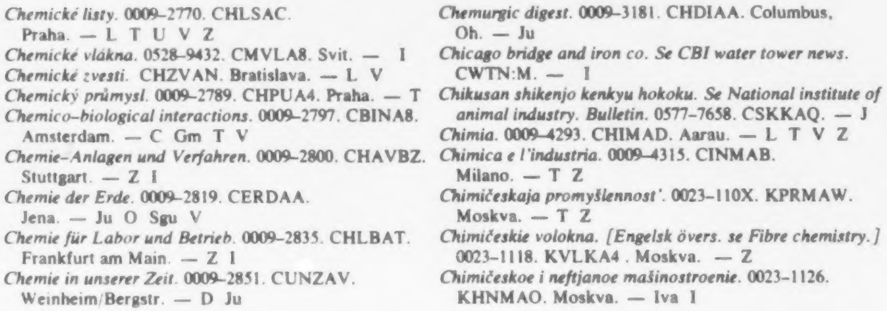
The titles in LIST TECH are (since 1972) associated with codes for identification. In the first place we use codes from the "Source Index", published by the American Chemical Society, (example: JACSAT for "Journal of the American Chemical Society). In cases where such codes are not available, we use "CODEN for Periodical Titles", published by the American Society for Testing and Materials, (example: ADMT-A for "Advances in Mathematics"; recent CODEN:s have an ultimate -B instead of -A). For the residual titles we have designed an indigenous LIST TECH code, recognized by an ultimate :B,:C... :Z in combination with four characters, (example AJEE:H for "Abstract Journal in Earthquake Engineering"). The ultimate letter is a classification code, (example: H= Earth Sciences and Oceanography), closely related to the COSATI-classification, to which have been added

:T	Patents. Standards.
:U	Measurement techniques.
:V	References. Abstracts. Secondary publications.
:X	Environmental Science. Air pollution. Water pollution.
:Z	Various contents.

Since the 1973 edition, titles are also furnished with ISSN (International Standard Serial Numbers). These are unique numerical codes (7 digits + 1 control digit) issued by ISDC (International Serial Data System) in Paris on behalf of UNESCO/UNISIST.

For the 1977/78 edition a complete revision of the LIST TECH file is in progress, to make it conform with the

Swedish Cataloguing Rules (SCR). The main difference is that, in the new version, entries according to title are included in addition to the institutional ones.



Chemické listy. 0009–2770. CHLSAC. Praha. — L T U V Z
Chemické vlákna. 0528–9432. CMVLA8. Svit. — I
Chemické zvesti. CHZVAN. Bratislava. — L V
Chemický průmysl. 0009–2789. CHPUA4. Praha. — T
Chemico–biological interactions. 0009–2797. CBINA8. Amsterdam. — C Gm T V
Chemie–Anlagen und Verfahren. 0009–2800. CHAVBZ. Stuttgart. — Z I
Chemie der Erde. 0009–2819. CERDAA. Jena. — Ju O Sgu V
Chemie für Labor und Betrieb. 0009–2835. CHLBAT. Frankfurt am Main. — Z I
Chemie in unserer Zeit. 0009–2851. CUNZAV. Weinheim/Bergstr. — D Ju
Chemurgic digest. 0009–3181. CHDIAA. Columbus, Oh. — Ju
Chicago bridge and iron co. Se CBI water tower news. CWTN:M. — I
Chikusan shikenjo kenkyu hokoku. Se National institute of animal industry. Bulletin. 0577–7658. CSKKAQ. — J
Chimia. 0009–4293. CHIMAD. Aarau. — L T V Z
Chimica e l'industria. 0009–4315. CINMAB. Milano. — T Z
Chimičeskaja promyšlennost'. 0023–110X. KPRMAW. Moskva. — T Z
Chimičeskie volokna. [Engelsk övers. se Fibre chemistry.] 0023–1118. KVLKA4 . Moskva. — Z
Chimičeskoe i neftjanoe mašinostroenie. 0023–1126. KHNMAO. Moskva. — Iva I

Table 1: Extracts from LIST TECH 1975/1976[5]

The development of the distribution of LIST TECH entries is represented in Table 2.

Year	RITL	CTL	Overlap RITL ∩CTL	Overlap I-libr. ∩public res.lib.	Only in I-libr.	Number of participating libr.		Total number of titles
						public res.lib.	industr. res.lib.	
1949	1550 (49%)	2300 (73%)	1310 (42%)	-	-	20	93	3150
1965	2690 (34%)	3130 (40%)	1780 (23%)	1000 (13%)	1560 (20%)	36	204	7800
1976	4100 (34%)	4170 (35%)	1330 (11%)	450 (4%)	2770 (23%)	44	240	11960

Table 2: Holdings of periodicals in LIST TECH
(percentages of total number of titles given in brackets)

A few observations can be made on the basis of these figures. The holdings of current foreign periodicals in the Chalmers library and the RITL are now almost of equal size. The overlap between the two collections has been steadily decreasing percentagewise. The overlap between the I-libraries and public research libraries is also decreasing, while the holdings of I-libraries, not represented in public libraries, is increasing.

From statistics over the last few years it seems that a certain level of saturation has been reached as to the total number of titles included in LIST TECH. The financial restrictions paramount in both public and industrial research libraries apparently enforce acquisition policies, where subscriptions to new journals are accompanied by about the same number of cancellations. So far no statistics are available concerning the details of such policies.

Initially (in the period 1949-1969) LIST TECH was published annually and produced by a conventional typesetting technique. Since additions, deletions and amendments, even over as short a period as one year, affect a considerable number of titles (nowadays about 30%), this technique proved to be rather inconvenient both for updating and proof-reading. It was therefore natural to consider a transfer to some kind of computer-based production. In 1968 the file was converted to machine-readable form by means of a Flexowriter (i.e. punched tape). This already made it possible, by means of a simple sorting and listing program, to produce individual lists for all participating libraries, a useful basis for soliciting information for updating the file.

The logical continuation of this process was of course to work towards fully computerized management of the LIST TECH file, including such operations as updating, sorting and production of various catalogues. The ABACUS system (AB Atomenergi Cumputerized User-Oriented Services) for handling bibliographic data, developed by Björn Tell and collaborators in 1966, readily leant itself for the present purpose.[6] Further, in co-operation with the

Institute of Electrical Engineers (INSPEC) and the publishing house Almqvist & Wiksell, a codification system for a sufficiently large character set (including diacritic variations) was designed, to make possible a representation of all titles appearing in LIST TECH including transliterations from non-latin alphabets. It was then a routine operation to produce, by the Almqvist & Wiksell phototypesetting equipment (of the Linothrone type), a camera-ready original for off-set printing with a varied typography. This procedure was first used for the 1970/71 edition.

RITL has been actively involved in R&D-work on a national computerized information system for Swedish research libraries (LIBRIS) right from the first feasibility studies in the late 1960s. An experimental network with a central computer in Linköping was set up relatively quickly, and from 1974 on the nodes were equipped with programmable ("intelligent") terminals. It was immediately clear that this equipment could readily be used for a number of different library routines (see the paper by S. Svanström in the present volume).

One of the first efforts in this direction was to develop a set of programs for management of the LIST TECH file. This file was transferred to the Stockholm Computer Center. Updating information was keyed from the terminal into a diskette-memory and later transmitted on the telephone line for merging into the main file. Merging, sorting and editing operations were performed by the CORSAIR program system, developed by the Research Institute of Swedish National Defence.

Very recently (in spring 1977) a new initiative was taken towards a wider use of these techniques for producing union catalogues. A first step was a commission from RITL to the photocomposition department at LIBER Publ. Co., to develop a versatile conversion program for processing the relatively restricted kind of bibliographic information carried by records describing periodical publications. This was to get around the problem of writing a tailor-made conversion program for each particular application. The LIST TECH programs have now been offered to the special libraries producing union lists in Economics, Agriculture and Life Sciences. In a somewhat wider perspective, these ideas and procedures are now considered by the nordic committee on union lists of periodicals (NOSP) which, reactivated under the sponsorship of the Nordic Council for Scientific Information and Research Libraries (NORDINFO) is trying to establish a Nordic catalogue of periodicals holdings within the main research libraries.

A spectrum of different catalogue products have been issued on the basis of the LIST TECH file, apart from the regular LIST TECH hard copy edition, e.g. a COM-microfiche edition and a list of holdings at RITL.[7] Lists of records associated with each individual library code are sent out to all participating libraries, which is a convenient basis for soliciting updating information. Since a couple of years the RITL-records are also furnished with data on current subscription rates, from which highly accurate indicators of price developments can be obtained.

In May 1978 a PDP-11/34 minicomputer with two disk drives will be installed at RITL. As one of the first projects of development we will design and implement a management system for periodicals control. The main file of this system will contain complete records of all periodicals held at RITL. It seems reasonable to transform the entire LIST TECH processing into a system of in-house operations run on the minicomputer.

REFERENCES

1. H.S. Lindstedt: *Katalog över periodiska publikationer tillgängliga i bibliotek i Stockholm och Uppsala och berörande matematik, geodesi, meteorologi, hydrografi, jordmagnetism, fysik, kemi, geologi och mineralogi samt de tekniska vetenskaperna och arkitektur* (Ingeniörsvetenskapsakademien, Stockholm 1927-1931)
2. G.R. Lomer & M.S. Mackay: *Catalogue of Scientific Periodicals in Canadian Libraries* (Montreal 1924)
3. A.J. Gates: *A Catalogue of Technical Periodicals, Libraries in the City of New York and Vicinity* (New York 1915)
4. C. Björkbom: Litteraturförsörjningen inom byggfacket (*Väg- och vattenbyggaren 5*(1959)1 p. 53)
5. *List Tech 1975/76*. Lista över utländska tidskrifter och seriepublikationer i svenska bibliotek inom teknik, arkitektur, fotografi, geodesi, industriell ekonomi och organisation, matematik, fysik, kemi (O. Palmaer (ed.), Stockholm 1976, ISSN 0491-0710)
6. B. Tell: *ABACUS - AB Atomenergi computerized user-oriented services. Frame work for computerized bibliographical records based on the generalized program system ABACUS* (KTHB-D-1, Stockholm 1967)
7. O. Palmaer (ed.): *The Royal Institute of Technology Library. Catalogue of current periodicals at RITL* (Report TRITA-LIB-2008, Stockholm 1978)

MECHEN - A BIBLIOGRAPHIC DATA BASE IN MECHANICAL ENGINEERING

by Peter Sabsay

The contents of the MechEn database

A considerable percentage of the Swedish industry has its main activities within the fields of mechanical engineering and associated branches. The industrial world is frequently searching for information of immediate practical value rather than highly advanced and theoretical information. However, most of the worlds bibliographic databases and information systems are conceived to satisfy the needs of scientists rather than technicians.

MechEn is a bibliographic database produced by the Information and Documentation Center of the Royal Institute of Technology Library, Stockholm.

The basic idea governing the selection of journals to be covered by MechEn is to produce a bibliographic database with a higly practical value in particular for the mechanical industry, as a complement to more scientifically oriented databases. To achieve this, some 200 journals in the fields of machinery, mechanical engineering, tooling and workshop practice not covered by Engineering Index or by Science Citation Index were selected. About 70% of the journals are of European origin, 25% are from the U.S.A. and 5% from various other countries. A list of these journals is supplied in the Appendix.

All articles on technical subjects in the journals are entered into the database, forming about 30% of the entries. The remaining 70% come from technical notes and products announcements. Letters and editorials are excluded. The idea of entering also technical notes and new products announcements, usually left out in

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MechEn is produced in conjunction with SDI projects at IDC-RITL and supported by grants from the Swedish Council for Scientific Information and Documentation (SINFDOK).

other bibliographic databases, evidently adds to the practical usefulness of MechEn.

Studies have shown[1] that the duplication of references is minimal between MechEn and tape services such as those offered by Science Citation Index, Chemical Abstracts and Engineering Index. When duplication occurred, the delay of the other databases was in some cases considerable (i.e. in the order of several months).

The selection of input material is continually revised to match the development of other tape services. Additions and deletions in the list of journals processed are governed by the processing capacity available for this project at IDC-RITL. This capacity permits an entry volume in the range of 35.000-40.000 per annum. The total volume processed in the period 1968-75 was 293.000 entries.

Unlike most other bibliographic databases, MechEn is produced exclusively as a tape service and is not a spin-off from the production of printed bibliographic reference journals. Whereas bibliographic databases usually are financed by revenues from the associated printed material, the cost of producing MechEn solely for computerized information retrieval is justified by its great practical value.

MechEn has gained a reputation of being a prompt source of applied technical information of highly practical value.

A possible development of MechEn is a further increase of entries on new products announcements. The production system of MechEn will also have to be revised. The tape punches used today are awkward and modern technology offers e g "key-to-disc" techniques which are already extensively used for other purposes at RITL[10].

Production of MechEn

By a restrictive policy with respect to data elements, costly indexing, classification and translation of titles are avoided, and administrative and processing costs in the production of MechEn can be kept at a minimum.

The bibliographic elements included for each item are: author, title, full title of source publication (journal), volume and issue number, page, number of citations, original language, language of title and a publication type code. Extremely short titles may be followed by subtitles and/or first or last phrase of the article. The title is in the language of the source journal except when English titles are furnished by non-English source journals. Approximately 51% of the references originate from English, 47% from German and 2% from French source journals. Some 60% give the title in English.

As soon as a new copy of a journal covered by MechEn arrives at the library, it is passed on to the IDC-RITL. The bibliographic elements are keyed directly from the source journals into machine-readable form with the aid of programmable Dura Mach tape punches.

Twice a month the punched tape is converted to 9 track 800 bpi magnetic tape in the KOMPOST record format[2,3]. A cumulated tape is also created to ease storing and facilitate future retrospective searches.

The introduction of the KOMPOST record format in 1974/75 involved great changes in all the stages of production of MechEn. New conventions, rules and guidelines for the punching e.g. of author's names, language codes and special characters occurring in titles were adopted. As far as possible the new conventions were made compatible with rules introduced through KOMPOST or with standards used by other databases, such as INSPEC.

The punched tape was previously sent to AB Atomenergi, Studsvik (AE) for conversion into magnetic tape in the old ABACUS record format[4]. Conversion into the KOMPOST format is presently performed by IDC-RITL at the Stockholm Datamaskincentral (QZ). The procedure involves as a first stage a conversion into an intermediary record format called ADOK. Programs had to be adapted to the OS operating system in use at QZ. A considerable amount of programming efforts had to be employed, as the handling of data sets under the operating systems DOS used by AE and OS used at QZ are quite different.

A detailed description of the data elements of MechEn will be found in "EPOS-VIRA Manual - MechEn"[5], which may be ordered from IDC-RITL.

The use of MechEn at IDC-RITL

The production of MechEn started in 1968. Originally it was produced as a complement to the SDI-department's (at the time) limited range of databases in the fields of mechanical engineering and mining. Today IDC-RITL offers a range of more than 20 different databases. MechEn is, however, keeping its status as one of the most valuable. The figures given below (taken from IDC-RITL annual reports[6-9]) will serve as an illustration of the use of MechEn at IDC-RITL.

	1968/69	1973/74	1974/75	1975/76
No. of profiles searched against MechEn	410	335	419	386
No. of processed MechEn references	40.000	43.700	32.968	37.255
No. of disseminated refs for MechEn	10.398	48.900	33.823	41.231

But the number of disseminated references does not tell the whole truth. The value of references may vary considerably. A different measure of how interesting the references are perceived to be is given by the number of requests for photocopies of the source material. As the items in MechEn are all entered from journals available at the RIT library, orders for photocopies of original articles, resulting from SDI-searches can be effectuated promptly.

A comparison of the relative response rate (number of orders for photocopied items divided by number of disseminated references) is illuminating:

	MechEn	ISI	INSPEC	COMPENDEX	CACON	SSCI
No. of orders for photocopies div. by number of dissem. refs. (in per mille)	27.7	6.4	13.2	17.8	9.3	0.9

These figures were taken from IDC-RITL internal statistics 1975/76. It will be observed that the response rate is quite exceptional for MechEn. The "score" of 27.7 corresponds to each 36th reference resulting in an order, compared with e g each 157th for ISI, or each 56th for COMPENDEX. It should however be noted that, for a different user group the "scores" will of course be quite different. They express a combination of essentially two factors. The first one is to what extent the data bases are structured so as to permit profile construction yielding high relevance of output. The second factor is the user's expectation to obtain requested material.

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APPENDIX

PERIODICALS COVERED BY MECHEN AS OF 1ST JULY 1976

Adhäsion (Berlin)
Administrative management (New York, NY)
Aluminium (Düsseldorf)
American foundryman's society, trans. (Des Plaines, IL)
American machinist (New York, NY)
American society of mechanical engineers. Diesel & gas engine power division. Conference, proceedings (New York, NY)
Appliance (Elmhurst, IL)
Assembly engineering (Wheaton, IL)
ATZ. Automobiltechnische Zeitschrift (Stuttgart)
Automatic machining (Rochester, NY)
Automatik (Heidelberg)
Automation (Cleveland, OH)
Automatisierung (Heidelberg)

Ball and roller bearing engineering (Schweinfurt)
Berg- und Hüttenmännische Monatshefte (Wien)
Bergakademie (Berlin)
Betriebstechnik (München)
Blech Rohre Profile (Coburg)
British corrosion journal (London)
British foundryman (London)
British steelmaker (London)
Bureau of mines. Information circular (Washington, DC)
Bureau of mines. Report of investigations (Washington, DC)
Bänder Bleche Rohre (Düsseldorf)

Canadian machinery and metalworking (Toronto)
Colorado school of mines. Quarterly (Golden, CO)
Computer aided design (London)
Copper (London)
Copper (Genève)
Corrosion prevention and control (Beaconsfield, Bucks.)

Design engineering (Toronto)
Deutsche Hebe- und Fördertechnik (Ludwigsburg)
Deutsche keramische Gesellschaft. Berichte (Bad Honnef)
DFBO-Mitteilungen (Düsseldorf)
Diesel engineering (Sevenoaks, Kent)
Diesel equipment superintendent (Stamford, CT)
Draht (Coburg)
Drahtwelt (Düsseldorf)

Electroplating and metal finishing (Watford)
Elektrische Maschinen (München)
Engineer (London)
Engineering and mining journal (Hightstown, NJ)
Engineering journal (Montreal)
Engineering production (London)
Erzmetall (Stuttgart)

F + H (Mainz)
F & M (München)
Fachberichte, Hüttenpraxis, Metallweiterverarbeitung (Coburg)
Factory (New York, NY)
Fertigung (Bern)
Fertigungstechnik und Betrieb (Berlin)
Filtration and separation (Croydon, Surrey)
Fluid power international (London)
Forschung im Ingenieurwesen (Düsseldorf)
Foundry management & technology (Cleveland, OH)
Foundry trade journal (London)
Freiberger Forschungshefte. Reihe A (Leipzig)
Freiberger Forschungshefte. Reihe B (Leipzig)

Gas Wärme international (Essen)
Giesserei (Düsseldorf)
Giessereiforschung (Düsseldorf)
Giesserei-Praxis (Berlin)
Giessereitechnik (Berlin)
Glückauf (Essen)
Glückauf-Forschungshefte (Essen)
Grits and grinds (Worchester, MA)
Gummi Asbest Kunststoffe (Stuttgart)

Hebezeuge und Fördermittel (Berlin)
Härterei-technische Mitteilungen (Freiburg/Br.)

Industrial heating (Pittsburgh, PA)

Industrial process heating (London)
Industrial world (New York, NY)
Industrie-Anzeiger (Essen)
Ingenieurs et techniciens (Paris)
Institute of metal finishing. Transactions (London)
Institution of mechanical engineers. Proceedings (London)
Institution of mining and metallurgy. Bulletin (London)
International journal of production research (London)
I.O. (Zürich)
Iron age (Radnor, PA)
Iron and steel engineer (Pittsburgh, PA)
Iron and steel international (Guildford, Surrey)
IVF-resultat (Stockholm)

Journal of applied pneumatics (Twickenham, Middlesex)
Journal of strain analysis for engineering design (London)

Kalibreur (Dortmund-Berghofen)
Klepzig Fachberichte fur die Führungskräfte aus Maschinenbau und Hüttenwesen (Düsseldorf)
Konstruktion im Maschinen-, Apparate- und Gerätebau (Berlin)

Machine and tool blue book (Wheaton, IL)
Machine design & control (London)
Machine moderne (Paris)
Machine-outil (Saint-Germain-en-Laye)
Machinery Lloyd (London)
Machinery market (London)
Machines and tooling (Malton Mowbray, Leicestersh.)
Machines françaises (Saint-Germain-en-Laye)
Manutention, transport, distribution (Paris)
Maschine (Ludwigsburg)
Maschine und Werkzeug (Coburg)
Maschinenmarkt. MM (Würzburg)
Maschinenschaden (München)
Maschinenwelt Elektrotechnik (Wien)
Material handling engineering (Cleveland, OH)
Materialprüfung (Düsseldorf)
Mécanique, matériaux, électricité (Paris)
Mekanresultat (Stockholm)
Messen und Prüfen (Bad Wörishofen)
Metal finishing (Westwood, NJ)
Metal finishing journal (London)
Metal products manufacturing (Elmhurst, IL)
Metalloberfläche, angewandte Elektrochemie (München)
Metallpraxis (Coburg)
Métallurgie et la construction mécanique (Paris)
Metals and materials (London)
Mining engineer (London)
Mining engineering (New York, NY)
Mining technology (Manchester)
Modern casting (Des Plaines, IL)
Modern machine shop (Cincinnati, OH)
Modern materials handling (Boston, MA)
Modern metals (Chicago, IL)
Modern packaging (New York, NY)
MTZ. Motortechnische Zeitschrift (Stuttgart)

Neue Hütte (Leipzig)
Neue Verpackung (Berlin)

O + P (Ölhydraulik und Pneumatik) (Mainz)
Oberfläche (Berlin)
Oberflächentechnik (Coburg)
Oel + Gas und Feuerungstecknik (Stuttgart)

Package engineering (Chicago, IL)
Packaging (London)
Packaging news (London)
Paper trade journal (New York, NY)
Phase zéro (Paris)
Plant operating management (New York, NY)
Plastverarbeiter (Speyer am Rhein)
Plating and surface finishing (East Orange, NJ)
Platinum metals review (London)
Power (New York, NY)
Precision metal (Cleveland, OH)
Product engineering (New York, NY)
Product finishing (London)
Production engineer (London)
Products finishing (Cincinnati, OH)

Quality progress (Milwaukee, WI)

Rationalisierung (München)
Regelungstechnik (München)
Regelungstechnische Praxis und Prozess-Rechentechnik (München)
Revue universelle des mines (Liège)
Rock products (Chicago, IL)

Schmiertechnik + Tribologie (Düsseldorf-Gerresheim)
Schweissen und Schneiden (Düsseldorf)
Schweisstechnik (Berlin)
Schweisstechnik (Wien)
Schweizer Archiv (Solothurn)
Schweizer Maschinenmarkt (Goldach)
Schweizer Technik (Lausanne)
Schweizerische technische Zeitschrift (Wabern)
Sheet metal industries (London)
Society of mining engineers of AIME. Trans. (New York, NY)
South African mining & engineering journal (Johannesburg)
Southam´s metalworking (Don Mills, Ont.)
Steel times (London)
Steuerungstechnik(Mainz)
Storage, handling, distribution (London)
Sub-assembly, components, fastening (London)

Technica (Basel)
Technik (Berlin)
Technik und Forschung (Düsseldorf)
Technische Rundschau (Bern)
Technocrat (Tokyo)
Tooling (London)
Tooling and production (Cleveland, OH)
Tribology (Guildford, Surrey)
TÜ (Düsseldorf)
TZ für praktische Metallbearbeitung (Stuttgart-Veihingen)

Und oder nor Steuerungstechnik (Mainz)
University of Minnesota. Mineral resources res. center. Progress rep. (Minneapolis, MN)
University of Minnesota. Mines experiment station. Progress rep. (Minneapolis, MN)

VDI-Berichte (Düsseldorf)
VDI-Nachrichten (Düsseldorf)
VDI-Z (Düsseldorf)
Verbindungstechnik (Frankfurt am Main)
Von Werkzeugen und Werkzeugmaschinen (Stuttgart)

Welding and metal fabrication (London)
Welding design & fabrication (Cleveland, OH)
Werkstatt und Betrieb (München)
Wire und wire products (New York, NY)
Wire industry (Oxted, Surrey)
Wire review (Oxted, Surrey)
Wire world international (Düsseldorf)
World mining (San Fransisco, CA)

Zeitschrift für Schweisstechnik (Zürich)
Zeitschrift für wirtschaftliche Fertigung (Freiburg)
ZIS Mitteilungen (Halle)

THE USE OF AN INTELLIGENT TERMINAL AS MINICOMPUTER IN LIBRARY MANAGEMENT

Stefan Svanström

A number of the major Swedish research libraries, participating in the experimental phase in the LIBRIS project, have been equipped with advanced computer terminals. On closer analysis, the capacity of these terminals as minicomputers can successfully be used in a number of common library routines. The gain is not only in speeding up operations, but also in increased reliability.

Two sets of programs has been designed and implemented at the RIT library with such applications in view. One set is concerned with different routines associated with updating of various files, management of acquisitions, text processing and list editing.

The other set of programs deals particularly with the idea of performing LIBRIS-operations (cataloguing) off-line, and to this end the original *LIBRIS* control program was modified and extended.

The hardware we use consists of two Incoterm SPD 10/20 intelligent terminals with core memory of 4K bytes and, in addition, a *RAM*-memory (Random Access Memory) of 2K bytes. Each terminal has also a dual-diskette connected to it, and to one of the terminals we have a centronics matrix-writer with a speed of approximately one line per second. The programs developed at RITL have been designed for our internal work.

Union list of periodicals

We produce a union list called *LIST TECH*, which gives the complete holdings of technological and scientific periodicals in most important Swedish libraries. This list is updated with the help of two programs running on the terminals.

The program *INMAT* is used to enter additions and changes to existing records. The program *NYPOST* is used to enter new records. The results of such operations are stored on a diskette. Amending records consist of at least two fields, the reference-number and one or more of the following fields: the journal title, the ISSN-number, a code for the journal title, the place of publication, codes for government libraries and industrial and institutional libraries.

The updating work is done in dialogue form, and the program *INMAT* asks for one of four commands, namely: *Add*, *Change*, *Delete* or *Replace*.

To select any one of these commands, you have to press the key marked *A*, *C*, *D* or *R*. The program then asks which field you want to change. Depending on which command and which field you have selected, the program performs different controls. For example: the control-figure in the ISSN-number is calculated, and an incorrect ISSN-number will not be accepted. The difference between *INMAT* and *NYPOST* is that the latter program sequentially asks for all the fields in a record, and you can skip any one, except the reference-number and the journal title, by pressing a special key.

When the file carrying updating information has been created on a disk, it can be transmitted to the computer-centre at a suitable opportunity. There the information is used to update the latest version of the *LIST TECH* master file.

Book acquisition routines

Another program called *FORV*, handles book acquisition operations. The program prints out lists of books which have been ordered. It also prints order sheets with the name and the address of the publisher, ready for a standard window-envelope. At present, a maximum of thirtytwo addresses of publishers can be stored in the program.

The program can also write reminders concerning non-satisfied orders. A specified date is entered as a parameter in the program, along with a code giving the instruction to print reminders. Books ordered before the day specified but not yet delivered are then listed in the form of reminders, which are dispatched to the publishers.

Text processing and editing

A fourth program is called *RAPPORT*. It is a program which lists text on the printer. The text has been created by means of one of the system programs called *EDIT*, which is a text-editing program. One basic idea of rapport is that you do not have to care about layout in terms of lines and pages. It is therefore very easy to insert new blocks of text or to delete a word or a phrase from the old text. Irrespective of changes, the resulting printout will be correct. When calling on the program, you give the name of the file of which you want to have a printout, the number of copies, where you want to place the left and the right margin and how many lines you want to have printed on each page. The program fills up lines and pages according to specifications, without cutting off the words.

Versatile list editing

A fifth program to be described is *KTHB-LIST*. This program prints records from a file located on a diskette. The basic idea is that you can make printouts defined by selection principles with different internal logic. On entering the records using the program *EDIT*, you can provide them with an arbitrary number of identification codes, each two characters long. When calling on the program you may specify whether you want to have a printout of all records. Alternatively you can state up to seven of these identifiers and choose between logical sum or logical product (*or*- resp. *and*-operation). In the *and*-mode all the codes you gave in the program call must be found in the record to have it printed. In the *or*-mode, at least one code must be found to trigger a printout.

In a special modification of *KTHB-LIST*, the printout of records is adjusted to fit sheets of adhesive labels. A file containing an address-register to persons on various mailing-lists within an organisation is created. These mailing-lists correspond to a number of distinct categories of interests. Each category is associated with a two-character code. Records in the file of addresses are extended to include adequate sets of category-codes, describing the addressee's profile of interests. It is then possible, by stating an appropriate set of codes and a retrieval logic corresponding to specified requirements, to produce a selective printout of addresses.

LIBRIS off-line and other *LIBRIS* improvements

The *LIBRIS*-program, which controls the Incoterm-terminals when connected to the *LIBRIS* system, is constructed to keep up the communication between the libraries and the central computer in Linköping. The program emulates a terminal with the commercial name *ALFASCOPE 3500*.

A couple of routines are implemented in the *LIBRIS*-program. One deals with printing of screen-text. Another one deals with conversion of special symbols to signs reoproducible by the printer. Further, the *LIBRIS*-program makes it possible to communicate with the central computer or to write new text onto the screen while the printer is working.

In order to improve the operations, we have solicited ideas from the libraries participating in the *LIBRIS* project. One suggestion was to make it possible to store records on the floppy-disk for later printout. This is useful, since some libraries have got one or more terminals which are not connected to a printer. Catalogue entries can be made from such terminals, but printouts of the records cannot be obtained directly. The procedure was to wait for a printer-equipped terminal to become free, then retrieve one record and print it out, then search for the next record, wait for the printer to get ready for printing, and so forth. This was obviously an awkward and time-consuming arrangement.

We have developed a program, *USLIBRIS* (*US* stands for "utan skrivare" i.e. "without printer"). This program works in the same way as the original *LIBRIS*-program, and in addition one can store records on the disk for later printout. In its present version, *USLIBRIS* can store 45 records. Five records before the end, the program gives the user a message of how many records he can still add onto the diskette.

With another program, called *SKRIVLIB* one can make printouts of the records stored on a diskette. The program will print out the records in sequence and it works off-line, so that the printout can be made after closing time. One advantage associated with *USLIBRIS* is that you need not suffer from the rather disturbing noise from the printer during the working session. Another advantage is that you get rid of all the waiting for the printer to get ready. Further, if you search for a record which is two pages long and if you want to have a printout with the original *LIBRIS*-program, you will have to wait for the first page to get ready before you can go on to the second one. The time for a printout of a page is approximately 50 seconds, while the time to store a record on the disk is less than one second.

We have developed another program, called *OLLIBRIS*, which is used for cataloguing off-line. The program puts out the cataloguing-formula on the screen, and the cataloguing work is made in the same way as usual. When a record is finished you press a special key, and the record is stored on the disk. The program generates a new formula on the screen, and the work goes on with a new record. This program uses the same area on the disk for storing records as *USLIBRIS*, so up to 45 records can be stored. You can also turn over records forward and backward in order to insert corrections. This can be made either during cataloguing or afterwards. The idea of *OLLIBRIS* is that cataloguing operations in *LIBRIS* can be performed when the central computer is closed for *LIBRIS*, or when the communication is interrupted.

A program called *INLIBRIS* is used to transmit the records to the computer.

Interruptions occur from time to time, with the effect, apart from the annoying delay, that once the communication is normalized again, the screen is blanked out and the work spoiled. When you work with *USLIBRIS* and are aware of an interruption, you can press a key and the record will be stored on a special track on the disk. When communication is normalized again, you make the regular initiating search in the *LIBRIS* data-bank. This results (since the item is not yet to be found) in laying out an empty formula onto the screen. Then you press a special key, and the record will be picked up from the disk and reproduced on the screen. You can now continue the interrupted cataloguing operation or send in the record to the computer if it was ready when the interruption occurred.

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3RIP: AN INTERACTIVE SEARCH AND EDITING SYSTEM FOR LARGE TEXTUAL DATA-BASES

by R. Larsson, C. Bryntesson, B. Johansson, M. Löfström, and J. Sunnebäck

The 3RIP search and editing system belongs to a fairly small class of man-computer dialog systems adapted to the processing of large, non-static, and in many applications rapidly growing files of textual records (bibliographic, legal, or medical data, e.g.).

A characteristic of this class of systems is that only a minute part of their primary files (containing the basic records) can be handled directly. During the next ten years this may change with the development of parallell processing techniques adapted to the requirements of text handling, but for 3RIP as for most other systems of its class the primary file is usually examined and accessed indirectly via an inverted file, where each record is a list of the implicit or explicit occurrences of a searchable item or keyword, and in order to find the primary file records pertinent to a subject wellknown and relatively simple combinatorial procedures are applied to the inverted file records relevant to the subject.

3RIP is primarily a search system, and there are other search systems of its class, systems with similar capabilities. A large scale implementation of 3RIP is of necessity an expensive matter and the potential usefulness of the system depends on a number of critical factors such as

- its capacity, i.e. the practical upper limits on file sizes and the number of simultaneously active terminals;

- the cost of running the system, i.e. staff costs, tele-communication costs and computer costs;
- the contents of its primary and inverted files, their availability and the type of search operations that they permit;
- the basic structure and flexibility of its command language;
- its help functions;

and

- the competence of and resources available to the organization running the system.

Our claim is that 3RIP compares favourably with the established search systems, that it is well suited to the processing of bibliographic information, and that it could advantageously be adapted to handle other types of primarily textual data. In order to support the claim the given critical factors with the exception of the last are examined.

The capacity of 3RIP

With the choice of file inversion as the fundamental technique follows that the cost of file maintenance and the average response time while searching grow approximately linearly with the size of the primary file. As a consequence 3RIP is designed to handle an integrated primary file of no more than four million records but on the other hand the system should not deteriorate badly before the limit is reached. In practice if not in theory a similar if not lower limit is imposed on all other systems based on file inversion. However, with 3RIP it is possible to restrict a search to any subset of the primary file, thus reducing the search costs and the response time.

The number of simultaneously active terminals that might use the 3RIP search system with acceptable response time will be dependent on the computer model being used and on the workload from other programs concurrently running under the same time-sharing monitor as 3RIP. However, if the workload not associated with 3RIP is small and the size of the primary file is on the order of two million records then from twenty to one hundred simultaneously active terminals are expected to get a satisfactory service from the system. The lower estimate is made for a DEC-20 computer while the higher is made for a large DEC-10 computer.

Costs

With 3RIP as with any other large interactive terminal system it is by no means a trivial matter to isolate the different costs associated with the running of the system, but it may be assumed that the staff and telecommunication costs of running a 3RIP system should not exceed those of similar systems. This claim is based on the fact that 3RIP is to be run under the well-tried and easily controlled time-sharing monitor of a DEC-10 or DEC-20 computer, and that DEC-10 computers for a number of years have been connected as host computers to computer networks such as ARPA.

In a conventional large search system more than half the total computer costs are associated with file maintenance and file storage. As a consequence of the file design for 3RIP[1] and of a sub-system for text compression[2] developed within the 3RIP project the amount of disc space needed for the 3RIP files is less than half of what an efficient conventional search system would have required, and for file maintenance with file compression included a similar claim can be made: the cost of adding a typical record (of some 500 characters of text) in encoded form to the primary file and of modifying the other files of the system accordingly will be less than 0.10 Swedish Crowns (this cost estimate is based on the rates at QZ, the university computer centre in Stockholm). The computer cost per terminal hour will for searching with 3RIP, if the same rates as those of QZ are used, vary between 50 and 100 Swedish crowns.

File contents and search operations

In the 3RIP search system the primary file records consists of fields of several types; for a bibliographic file they might be author, title, abstract, date, etc. The different fields or words within the fields are regarded as keywords or ignored in accordance with the values assigned to the control parameters that govern the process of file inversion. For each keyword its primary record number and in some cases a value part is stored into the inverted file. In the existing test version a value part is used for keywords in some text fields; it indicates the locations of the keywords within their primary records.

Bibliographic data bases from a variety of different sources can be transferred directly into the primary file of the search system as files in the KOMPOST[3] format are accepted by 3RIP (KOMPOST is a common format used for all the data bases that are processed in the SDI service of the library of the Royal Institute of Technology). Primary file records can also be created or modified by the 3RIP text editor which is designed to operate on the primary file record format.

The conventional and selfexplanatory operations of interactive search systems on inverted file records (FIND, AND, OR, ANDNOT, etc.) are supported by the 3RIP search system and the operators AND and ANDNOT can be qualified to test on the distance between the occurrences in the primary file of their operand keywords. An auxiliary file is needed, however, to help a user of the search system to find keywords relevant to the subject of his search. This file is lexically ordered and contains all the recognized keywords of the system and rotated forms of keywords of given types. The record format of the file conforms to that handled by the text editor and the file may thus be complemented with semantic relations, i.e. synonyms and other related terms may be stored together with a keyword. From this file the proper form of a keyword can easily be found, string searching is made possible through selection of keywords containing the string of interest, and a thesaurus structure may be gradually established by the text editor.

Command language and help functions

At present the system is being tested with a bibliographic file of moderate size. At the end of the test period (June 1977) the primary file of this application of the system will contain some 200 000 records or about 100 million characters. Critical parts of the system will be optimized and different types of command languages for the handling of bibliographic information will be tested. It is for example a relatively trivial matter to implement the command languages of other interactive search systems within 3RIP. For other types of well-defined applications of the 3RIP system it seems likely that no serious difficulties will appear in an implementation of a similar dedicated set of commands.

Another object of the test period is to find out where and when in the interaction with the system inexperienced users need help. This will be given in the form of messages to the user's terminal from the system message file, which will be created and modified by the text editor.

Concluding remarks on extensions of 3RIP

The versatility of the 3RIP system can be illustrated by three subsystems within 3RIP that are being developed and that are to be ready by June 1977.

Command sequences can be reconstructed and saved by the 3RIP editor and later triggered at will through an interface routine which treats the contents of the record as a set of commands. This system facility will be used for two different purposes.

A generalized form of SDI service will be made possible as an SDI profile can be saved and modified by the editor and later be activated on demand or at intervals chosen by the owner of the profile or by a documentalist responsible for the handling of the profile. Thus an improved SDI service might be a side effect of the establishment of a bibliographic interactive search service based on 3RIP.

In like manner command sequences or cycles for controlling input from or output to a terminal can be stored by the editor and later be used for the purpose of form handling including validity controls.

For non-bibliographic data bases it is assumed that some capability for handling numeric information is needed. This is to be incorporated into 3RIP simply by allowing different interpretations to the value parts in the inverted file and introducing a set of operations adapted to the processing of numeric vectors associated with those keywords that may have a value.

There are a number of applications where large textual files containing some numeric data have to be searched and processed in a fairly simple manner. Examples of such applications are the handling and coordination of real estate, product, and environmental information, the establishment of computerized library systems, the handling of medical case records, of registers of official information, and of data banks of legal texts. Generalized data base management systems are in some cases being used; often with moderate success as their text handling capabilities are very rudimentary. Our contention is that a suitably adapted 3RIP system or a similar approach would offer a far more flexible and inexpensive solution.

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IMPLEMENTATION OF A NEW INTERACTIVE ON-LINE INFORMATION RETRIEVAL SYSTEM: 3RIP

by Malin E. Edström and Marie A. Wallin

SUMMARY

3RIP is a new on-line interactive information system developed at the RITL. It is characterized by improved storage allowing simultaneous search of several large databases at choice. Implementation of the system concentrates on developing user-aids, which should facilitate ready access to the system for any user who is familiar with either the ELHILL-ORBIT or DIALOG-RECON families of bibliographic retrieval systems: Alternative user-language and on-line thesauri are discussed.

I. Introduction

The last 15 years have seen many changes in the world of libraries. With the introduction of computers able to handle alpha-numerical information the librarian got a new tool making part of his work faster and more effective. As soon as bibliographic references were available on magnetic tapes, automatized current awareness systems became possible. As time went by those magnetic tapes were accumulated containing information from many years. Retrospective searches then became possible, first in batch mode, using the current awareness systems, and later, on-line. Many on-line systems have been developed for interactive searching of bibliographic files, but only a few of them can handle large files, i.e. more than one million references. Since there has been and is a continuing competition between these large systems they all have gradually improved and by now the established systems have more or less the same search facilities. The largest difference among the major systems is in the files available although even there the overlap is large. This induces the user to keep to the system he is most familiar with, the one he learnt first or the one he was obliged to learn because it was offering the most files in his field of interest. Even more so, as on the whole, all major existing systems cost about the same for the average user.

Anyone who has used any of the existing systems has experienced need for various features that are lacking. But less often perhaps has he/she reflected on how a truly interactive information retrieval system should behave in order to be adapted to an experienced user.

We are all limited in our imagination and there most certainly could be approaches to searching that differ completely from the ones used in the now existing systems, but we can still discover many possible improvements by looking at the features of existing information systems.

II. Desirable features for IR-systems

A. First of all, a system must be cheap to use. It should be cheap not because it is heavily subsidized, it should be cheap because it is efficient. The user should have the possibility to know the cost of searching. Therefore he should be able to find out the costs of various commands and at any time during the search be able to ask the system for the actual cost of the search as well as for the time spent at the terminal or within a file.

B. Logging in procedures should be easy but at the same time provide high security. There should be no possibility for anyone to "take over" another user's search without being authorized.

C. The user should be able to search many different files simultaneously since most queries need searching through several bibliographic files. A merged list of all searchable terms from all the files available in the system should be available for selection any time. This list should, for each of these terms, indicate the number of references in each file as well as contain a built in thesaurus where the user can straight away select whole hierarchies or groups of terms. (So far no existing large system has such a merged list over files that are not of the same origin/producer. Each file has to be searched separately).

D. There should not be any limit on the number of statements or references stored during a search. All the fields should be searchable and the same codes naming these fields should be used all over the available files as well as for the different searching and editing procedures. It should be possible to limit searches or parts of them to specific files, periods of time, languages and/or literature types.

E_1. The system should operate in one mode only, being prepared for any command at any time. If no command is given it should search for the given string or if this is a number accept it as a statement number. Old search statements and new search terms should be available for combining. If a term that has already been selected earlier during the search is entered then the system should respond by giving the number of the statement in which the term was selected as well as the number of postings. If a searched word is in a stop list then notice of that should also be given. Intersection of search statements in matrix form in order to allow the user to judge if a combination is worth doing is a very useful feature indeed which up to now is only found in RECON.

E_2. It should be possible to nest commands using brackets and to enter many commands in one sequence. These possibilities in combination with distance operators: "within" a sentence or a paragraph or "adjacent" are in most of the cases sufficient. Especially if it is possible to specify in which order the terms should appear. Right hand truncation of search terms is a necessary facility found in all modern systems but the left hand truncation giving the possibility to select at once all possible prefixes for a stem should be provided as well. Some efforts are apparently now being made in this direction for ORBIT as well as DIALOG. Masking of a character to catch different spellings and truncation within a term are very useful and exist already in some systems (ORBIT, RECON, MISTRAL).

F. The command language must be simple and more or less self-explanatory and there should also be a possibility to introduce private command languages. This would make it more easy for a user to switch from one system to another. Alternatively various common command languages should be built into each system for the users choice.

G. A spelling error in the searched string should be easy to correct even after the string has been sent to the computer. It should be possible to cancel the execution of an erroneously sent command specially if this concerns printing off-line.

H. A search history giving all the search statements, combinations and number of selected references should be given on request with indication of the file or files searched. Default values used during the query negotiation should also be indicated in this summary of the search. It must be possible to delete search statements in the course of a search not only because the possible number of search statements or the memory available is generally limited but also in order to be able to edit the search for further use of it.

I. The references should be available for printing both on- and off-line. There should be some predefined formats at choice but also some possibility to specify individual printout formats. Listed references should be sorted by date but other sorting alternatives should be available e.g. by literature type, author name, journal name, etc. Indication of the last update of each searched file should appear on these lists and of course it should be possible to trace these updates in the files. An area for saving the references selected out of those displayed should be provided with some possibility to save at the same time comments relative to these references and originated during the search.

J. Retrospective searches often initiate an interest for following up the literature on the subject or require some other kind of updating. Therefore some possibility to save the search should be included in the system. A saved search could then be used as part of another search, for SDI or only to modify the earlier search.

K_1. At any time during a search it should be possible to ask the system for help. Help commands should be easy to enter and suggestions for further help using some kind of menu listing or questions (as is done in MISTRAL for instance, though in a somewhat too esoteric form) should be provided.

K_2. When a user makes an error the system should shortly state that an error was made: The experienced user usually recognizes the error. If further help is needed by the user he could state so by writing e.g. a question mark. The system then should analyze the error, clearly spell out the error, and give some suggestions on what could be done instead.

K_3. When unforeseen problems appear the user should have the possibility to question someone responsible for the system from his terminal. It would also be good to be able to discuss problems with other users at their terminal and be able to learn the use of the system from someone at a distance.

L. If the system breaks down or the searcher is logged off by mistake it should be possible to restart the search without loosing more than a few of the commands given before the breakdown.

M. In an international enviroment it is preferable that the user can communicate with the system in any language he chooses i.e. there should be alternative versions of the help messages as well as of the commands or at least provision for such.

N. Database management features of the system gain in importance especially in a library environment. The files on the system should be easily updated and it should be possible to build files both on-line and in batch. It should be possible to correct or complete references on-line. A possibility to transfer records from one file to another should be provided to allow building up of special files or permit easy ordering of documents on-line.

O. Last but not least the user must have an influence on the developments of the system as well as being continously instructed about these. He must have some forum to discuss problems and suggest improvements, preferably with other human beings.

III. Description of the 3RIP system

For some years now the Swedish Council for Scientific Information and Documentation - SINFDOK - has sponsored the development of a new interactive on-line information retrieval and editing system called 3RIP.

III a). File structure and data description of 3RIP

This system can in principle handle an unlimited number of records. In its first implementation it is used for processing bibliographic references but it can also handle other large files of text or numerical data. It can also perform simple numerical operations on the data in its files. The program is written in the programming language BLISS to be run on a DEC 10 computer but could also be run on a DEC 20. The program requires some 50,000 words of core memory and no more than one copy of the code is needed for all users. If the average number of users is low it is advisable to employ the virtual memory handling facilities of the computer, thus reducing the amount of core storage for a user to some 20,000-25,000 words. The system can serve from 20 (DEC 20) to 100 (a large DEC 10) simultaneously active terminals. The ASCII code is used to represent character strings.

As in other large systems the searchable elements are found in inverted files. For the 3RIP system however a special record format and a file structure have been designed to partially overcome the typical drawbacks of the conventional inversion technique when applied to very large files, firstly the need to limit the size of the inverted file and consequently reduce the number of elements directly searchable, and secondly the cost and difficulty to update the file.

3RIP works basically with three files:

(1) the primary file which contains the records proper: This file is kept on disk storage. The compact format used reduces the needed storage capacity to less than one-half of that used by other systems. 3RIP is intended for the processing of very large files and should work satisfactory with up to 4 million records (of an average of 500 characters each) in the primary file. This figure should be compared with the number of bibliographic references which have to be searched in a typical search i.e. 3 to 4 databases of more than 500,000 records each.

(2) the inverted file which is also kept on disk but unlike the other files used in the system, not in the compact format. This file contains for each searchable string (keyword) a list of its occurrences in the

primary file. A value part may be added to each occurrence indicating the position of the keyword within the primary record or containing a numerical value of the attribute (keyword) in the record.

(3) the ALPHA file is an alphabetically ordered file of all available search terms from all the databases available in the system regardless of the file being on-line or not at the time. The type of the field in the primary record as well as the name of the database and the number of primary records which contain it is given for each string in this list. The ALPHA file also contains rotated forms of the keywords in the file as well as generic relations between the words in order to allow construction of thesauri in this file.

The records themselves in the primary file consist of two parts: a data part divided in one or more datafields each divided in one or more subfields and a control part containing the record identifier and for each field containing location and size of its subfields. A record may contain any number of datafields and subfields and a subfield may be of any size. Within each record one field is reserved and may be used to indicate if any of the other fields of the record has to be treated in some special way when processed. This permits accomodation of complex data structures. It could be used for instance for limiting access for display, printing or transfer to only a part of a database.

All textrecords are represented in two equivalent structures: an external form for secondary storage and an internal one when they are taken into the computer primary storage. In the external format the data are stored in one string and may be compressed. In the internal format each string is represented by a doubly linked list. This list structure allows easy on-line updating of the records.

When a record has to be processed the record in the external form is read into primary storage and the control part is transformed into the internal format and compressed textual data are decoded. The cost of compressing a million characters is estimated to some 75 SwCr and to the normal user the cost and time for decoding will be negligible.

In order to reduce the number of different files used for running the 3RIP system all files contain the necessary information for processing the data i.e. directory as well as control information. The directory is arranged as a B-tree on the name (record identification) strings. Because of this special structure new files are easily and quickly created. Updating is fast and easy and corrections of individual records may be done on-line.

III b). Search_features_of_3RIP

3RIP is working in one mode only, viz. it is prepared for any command any time.

A special feature of 3RIP is that the user can build his own command language and store it! Using this possibility, versions similar to two of the most common interactive searching languages have already been built into the system. However, although several commands in the different systems yield equivalent results these commands do not in fact perform the same operations and translation from one language to another is not trivial. Only for a part of the usual commands is the equivalence sufficient for the translation to be meaningful. Fortunately this part includes many of the most used retrieval commands and is often sufficient for an occasional user of the system.

Thus when starting a search in 3RIP the first operation will be to build one´s own command language or select one of the common command languages which have been or will be built into the system. The command language used through this paper will be 3RIP´s own and each command function explained.

Selection of the search terms starts in the ALPHA file and there is no need to choose which of the different databases available one wants to search as all retrievable terms are merged in this file. If one wants to limit the search to one or several of the databases available in the system one can do so at this point or later on limit the selection of the terms to the desired databases.

The EXPAND command displays usually 5 terms centered around the desired term and can be scrolled forward or backward as much as wanted. The scrolling through the list is unlimited and it is also possible any time to centre the display onto another term. The listed terms are numbered and can be selected by these numbers both individually or grouped. When "expanded", terms are given with indication of their type (keyword, author, etc.), the database to which they belong and the number of references in that database which contain the term. This information can be suppressed when scrolling in the ALPHA file and individual words can be "exploded" instead i.e. listed with the name of the databases in which they appear, their type and the number of records containing them.

When using a TYPes command before expanding a term the display can be reduced to certain types of terms only, say descriptors, or authors, or document types etc.

Writing TYPes ROTate before an EXPAND command will give the list of all the rotated forms of the expanded term and permit the selection of prefixed terms as well, i.e. act as a left truncation. Using the command FIND or just typing a term, truncated or not, will select the term as written, but since 3RIP is intended for searching in free text files it may be advisable to expand first in the ALPHA list to make sure there are no variations or different interpretations of the term.

If the term has already been selected in an earlier set the system responds by telling in what set the term was stored. Indeed each separately selected term is stored in a search statement (set) which is numbered and can be referred to afterwards for use in logical combinations with the operators AND, OR, and ANDNOT.

There can be up to 450 search statements during a search. Since the positions of the terms within the primary record are stored in the inverted file as well as the field of the record in which the term appears it is possible to make contextual searching, specifying the distance desired between the terms, in which order they should appear in the record and/or in which field.

An ALIAS command permits to rename a search statement and then use this name further on in the search instead of the statement number. This can be a good mnemotechnic tool for the user when grouping different statements during a search.

A setlist is available which gives a list of all statements, "aliases" and even limits used during the search. Searches can be limited by file or files, type or types, and periods of time at the start of a session or any time before selecting terms.

Not until the records are to be displayed or printed has a file to be selected. The records can be printed on- and off-line in any format. A number of predefined printing formats are offered but it is also possible for the user to define his own format and to store it for further use.

There is an editor in 3RIP which handles these functions. It is primarly used for creating new text records or modifying existing records, e.g. those satisfying the search. In this file the records are kept sorted by database but can be merged and sorted according to other criteria such as record number, author, journal name, etc.

The reconstruction and saving of commands is done by the editor. If a searcher is logged off the system without giving the EXIT command the search is saved and it will be easy to get back again. In this case the addresses of the selected terms are stored and the search should be continued before any file update. When the EXIT command is given the user is asked if he wants to save the search. If so, the search terms without their storing addresses are saved and it will be possible to edit the search for later use for SDI.

Macroprofiles, i.e. searches used later on as part of other searches, can also be saved this way. This gives the possibility to the users to save their own lists of synonyms, equivalent terms, or specific translation dictionaries.

The most frequent errors when searching are typing errors or impatient commands from the user who doesn´t wait for the user prompt. Therefore the first error message will be very short in 3RIP and a more explicative message comes first after the user has asked for such by striking the question mark. The system will comment on an error first by ec[illegible]ing the "message" it has received and then help will be offered in the form of menus, which will guide the user towards the right action. The user will be able to interrupt answering questions from the system at any time he realizes himself how to overcome the problem.

At any time during a session the system can be asked how much the user will be charged for what he has done, using the command CHARGE. At the time of writing, when no large scale implementation has yet been made, it is difficult to assess the costs of running the 3RIP system. File maintenance and storage are responsible for more than half of the computer costs in conventional systems, in 3RIP the file design and text compression have reduced the amount of needed disk space to about half.

The time for searching will be about the same as for other systems, but by using the command CHARGE the searcher can keep himself aware of which commmands cost more to perform and hopefully learn to plan the search strategy to reduce costs. If actual figures have to be stated it can only sofar be said that at the present rates of the Stockholm University Computing Center, the computer costs for running 3RIP are between 50 and 100 SwCr per hour ($10-$20 per hour).

IV. Conclusions

Even though 3RIP does not have all the features we wanted of those suggested we find in it most of the search capabilities found in other systems as well as some important new features, like searching rotated strings and using different command languages. The editing functions play a large role in 3RIP: Since it is still mostly intermediaries who search bibliographic information systems, these functions will help them to edit the result of their search and make it more useful for the ultimate user. Today the layout and editing as well as the possibility to get help during the search is playing an ever more important role. The systems must be easy to use, they are not made for the programmers but for the users.

1977-10-03

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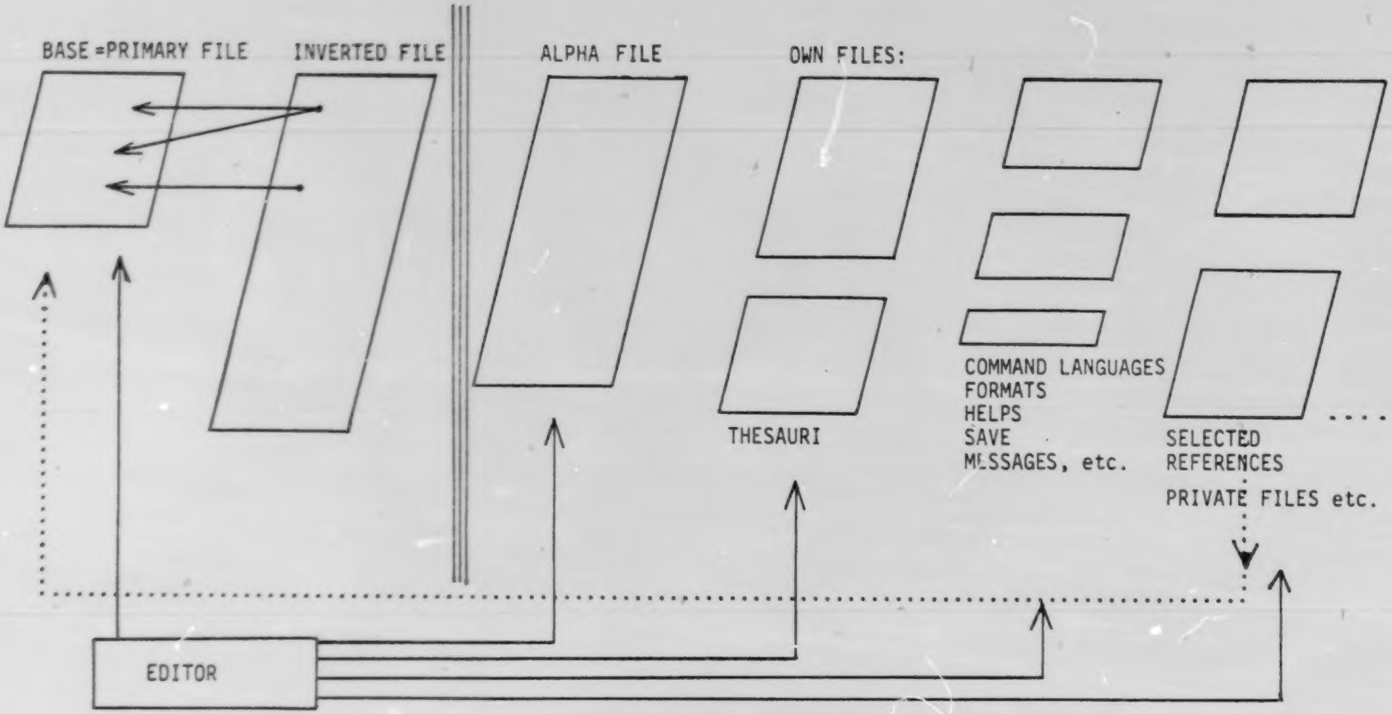

BASE = PRIMARY FILE
INVERTED FILE
ALPHA FILE
OWN FILES:
THESAURI
COMMAND LANGUAGES
FORMATS
HELPS
SAVE
MESSAGES, etc.
SELECTED
REFERENCES
PRIVATE FILES etc.
....
EDITOR

FIG. 1 - 3RIP files.

```
RUN THRIP
PASSWORD:
CONTROL FILE: CON440.CTR
NAME          STATUS
INSPEC        ACTIVE
CURRENT LIMIT SET NO = 500
*INFORMATION OR DATA
RESULT SET NO = 3;  1527 OCURRENCES IN 918 RECORDS
*DEFAULT 2
*EXPAND TRANSMISSION
-5     TRANSLUCENT
-4     TRANSM  AND DISTRIB   USA
-3     TRANSMATION
-2     TRANSMEMBRANE
-1     TRANSMISSIBILITY
 0     TRANSMISSION
+1     TRANSMISSION LINE
+2     TRANSMISSION THE
+3     TRANSMISSIONS
+4     TRANSMISSIVE
+5     TRANSMISSIVITY
*EXPLODE 0
 0     TRANSMISSION                                KEYF  INSPEC     619
                                                   KEYC  INSPEC     163
                                                    ORG  INSPEC      16
*SELECT 0,2
KEYF: TRANSMISSION
SET NO = 4;  643 OCCURRENCES
KEYC: TRANSMISSION
SET NO = 5;  143 OCCURRENCES
ORG: TRANSMISSION
SET NO = 6;  16 OCCURRENCES
KEYF: TRANSMISSION THE
SET NO = 7;  1 OCCURENCE
*3 * (4+5+6+7)
66
```

FIG. 2a - Some   3RIP search features: EXPAND and EXPLODE. DEFAULT: Changes the default value of the EXPANDed lists' layout. 2 suppresses the information on term type, data base, and occurrences.

```
*ALIAS TRANS.,7

*3 AND (8 OR 9) AND TRANS.
RESULT SET NO = 13; 56 OCCURRENCES IN 41 RECORDS
RESULT SET NO = 14; 22 OCCURRENCES IN 14 RECORDS
RESULT SET NO = 15; 2 OCCURRENCES IN 1 RECORD

*SETLIST
SET       GENERATING COMMAND                    OCCURRENCE COUNT
 1        FIND 'INFORMATION',2,500                           361
 2        FIND 'DATA',2,500                                 1111
 3        1 OR 2                                            1527
 4        FIND 'TRANSMISSION',2,500                          643
 5        FIND 'TRANSMISSION',3,500                          143
 6        FIND 'TRANSMISSION',7,500                           16
 7        4 OR 5                                             781
 8        FIND 'ONLINE',2,500                                 42
 9        FIND 'ONLINE',3,500                                 14
10        9 OR 8                                              56
11        3 AND 10                                            22
12        11 AND 4                                             2
13        8 OR 9                                              56
14        3 AND 13                                            22
15        14 AND 7                                             2

*CHARGE
TOTAL SESSION COST 7:15 SWCR

*FORM OUTF

*PRINT
-1-                 RECORD NUMBER: 7308

          TITLE:  REMOTE BATCH VS INTERACTIVE PROCESSING

             AUTHOR:    BUCKLEY, J.E.

*FORM UT

*PRINT
-1-                 RECORD NUMBER: 7308

TITEL:                    FORFATTARE:

REMOTE BATCH VS           BUCKLEY, J.E.
INTERACTIVE PROCESSING


TIDSKRIFT:                KOD:

COMPUT. DES. (USA)        CMPDAM
VOL.14, NO.9
10, 14
```

FIG. 2b - Some 3RIP search features: ALIAS, SETLIST, CHARGE, and PRINT.
SETLIST: each term is selected in a separate set. Term type (2=KEYF, 3=KEYC, 7=ORG) and current limit set are indicated.
PRINT: The printout formats OUTF and UT have been stored earlier by this user. They are activated by writing FORM and the name of the formats.

```
*TYPES ROT

*EXPLODE ONLINE
EXPAND FIRST

*EXPAND ONLINE
-5    N*ONLEPTONIC
-4    COLLISI*ONLESS
-3    DIFFUSI*ONLESS
-2    DIMENSI*ONLESS
-1    RADIATI*ONLESS
 0    ONLINE
+1    ONLINE  GERMANY
+2    N*ONLINEAR
+3    N*ONLINEARITIES
+4    N*ONLINEARITY
+5    N*ONLINEARLY

*GROUP 0 TO 1
RESULT SET NO = 24; 58 OCCURRENCES IN 43 RECORDS

*SETLIST 18 TO 499
 SET      GENERATING COMMAND                   OCCURRENCE COUNT
 18       FIND 'ONLINE',2,500                                42
 19       FIND 'ONLINE',3,500                                14
 20       FIND 'ONLINE  GERMANY',6,500                        2
 21       18 OR 18                                           42
 22       21 OR 18                                           42
 23       22 OR 19                                           56
 24       23 OR 20                                           58

*CHARGE
TOTAL SESSION COST 6:56 SWCR

*EXIT
```

FIG. 2c - Some 3RIP search features: ROTated list of terms, GROUP as a form of SELECT and CHARGE.

A PERSPECTIVE OF LIBRARY EDUCATION - Experiences from RITL

by Peter Sabsay

1. Introduction

Instruction for library users has traditionally been offered by many research libraries. The rapid growth and development of information retrieval services and the changing and more comprehensive role of libraries have brought this kind of education into focus. This paper gives an overall presentation of the different educational activities of RITL. These efforts have increased considerably during the last years and RITL is involved in a broad spectrum of programs developed for different user groups.

The introduction of new information retrieval methods is correlative not only with user education but also with marketing. The mere availability of new methods is not enough to create a demand, since potential users also have to be made aware of the existance and usefulness of these services. The distinction between education and marketing in the field of information services is not always very clear. All educational activities will have a marketing effect and most marketing activities will have some educational effect. This paper is however not concerned with the pure marketing of specific IR services but will occasionally mention marketing activities in an educational context.

The main target groups for the educational activities to be discussed are:

1. End users of information
2. Intermediaries (i.e. library staff, information officers etc.)
3. Students (future users of information services)
4. Trainees (a heterogeneous group)

The presentation is structured in accordance with the division into target groups quoted. For each group the educational activities are briefly described and summarized. The education in information retrieval given to RIT students is more deeply penetrated. The discussion illustrates some of the considerations and ideas behind the introduction of such courses and also illuminates some of the problems of library user education.

2. Target groups and educational programmes

2.1 Systems, services and users

Since 1968, the Information and Documentation Center of the Royal Institute of Technology Library (IDC-RITL) carries out research and development on computerized information retrieval (IR) in the form of projects with grants from SINFDOK, the Swedish Council for Scientific Information and Documentation.[1] In parallel with the development and implementation of IR systems, IDC-RITL offers information services to a great number of users. An SDI service based on the EPOS-VIRA system[2] (developed at RITL) is run for some 2000 individual subscriptions matched against about twenty different bibliographic data bases.

From the start, user education has necessarily been an integral part of IDC-RITL activities. It was early recognized that it would not be satisfactory just to develop and introduce new IR techniques in a situation where not even traditional search techniques were used efficiently. During the fiscal years 73/74 - 75/76 more than 25 seminars/workshops were held with participation of some 600 invited users of documentation services from universities and industrial firms. In some cases these seminars were held at RIT (so called "SDI-days") and in some cases information officers from IDC-RITL would go to an organization to conduct a seminar for its personnel. The programme of such a seminar included general lectures on technical and scientific communication and information retrieval techniques as well as specialized lectures on the EPOS-VIRA-based SDI-system, the available data bases and principles of profiling. A demonstration of on-line retrospective literature search and practical exercises in SDI-profiling were also parts of the programme. After the seminar the SDI profiles created by the participants were run for a trial period of two months free-of-charge. Such activities are of course also a marketing tool but the major goal was to raise the participants' general awareness concerning possibilities and problems in information and documentation.

As some of our end users expressed their interest in learning more about the characteristic features of EPOS-VIRA and about the different data bases, a one day SDI user seminar with some 40 participants was held in March 1975. Most users of IR services are however not highly motivated to learn the details of IR techniques and to keep up with technicalities like changes in data bases or systems. With few exceptions[3] SDI systems are designed to be handled by intermediaries (documentalists or information officers).

The formation of documentation units at various research libraries and industries marks the growth of a national network of I&D-services, where the RITL-systems play an integral part. Co-operation with the documentation units at the University of Lund (LUBDOK) and at AB Atomenergi (AE) in Studsvik, the Helsinki Institute of Technology, the Norwegian Institute of Technology, Trondheim (NTH), and the Swedish telephone company, Telefonaktiebolaget LM Ericsson (LME), can be regarded as the first steps in this direction. The close cooperation established in 1974/75 with the Medical Information Centre, MIC[4] (formerly BMDC), also increased the accessibility and general utility of EPOS-VIRA.

The demand for on-line services is continuously growing and about 860 hours (including demonstrations) of retrospective search on the ESA/RECON system in Frascati, Italy, were performed in 1975/76 at IDC-RITL. Further, the dial-up service to ESA-RECON via a node at IDC-RITL[5] enables anyone having access to a teletype compatible terminal to dial in and perform their own search. Suitable terminals sell at less than 10 000 SCr. As there is no charge for the contract needed to join the dial-up service, it is economically feasible for a vast number of organizations to use this service. The node is operational since June 1976 and has a rapidly increasing number of users. This development calls for extensive educational activities.

Most of the educational courses mentioned previously have of course also been attended by intermediaries, especially documentalists and librarians from universities and large industrial firms. However, not only these categories of professionals will operate the system, but also a large number of end users who prefer to use the on-line systems as a quick reference tool. A number of one-day courses introducing the basic commands and search strategies and presenting the major data bases have been held during 1976/77. The need for more advanced courses in on-line search techniques for the somewhat experienced user is also recognized.

2.2 Intermediaries

In 1975 a plan was adopted with a view to decentralize the input and handling of profiles to EPOS-VIRA.[6] University libraries and private enterprises were encouraged to form documentation units to take care of the local information needs. Documentalists at each unit should work as intermediaries between the end users and EPOS-VIRA, i.e. they should have all the contact with the end user, perform all the profiling and be able to operate the profile handling program EPOS from their own terminal.

The training of documentalists from e.g. LUBDOK, NTH, MIC and LME was originally organized on an *ad hoc* basis. Now a formalized training for documentalists was inevitably needed. The lack of any existing practical courses for documentalists emphasized this need. In May 1976 the first one-week basic EPOS-VIRA course was held with 12 selected participants from universities and industrial firms. The curriculum included lectures on scientific and technical communication, the EPOS-VIRA system, profiling, the role of the intermediary, organizational and practical aspects of decentralized EPOS-VIRA use, data bases and acquisition of primary material. Emphasis was put on practical exercises in formulating SDI profiles, in utilizing data bases and in the handling of EPOS via terminal.

The basic EPOS-VIRA training is planned to be a regular feature recurring twice to three times a year. It will be followed up by two-day continuation courses and by seminars e.g. on specific data bases and their use.

The need for advanced training programmes in on-line searching techniques is also evident. The "Advanced On-line User Seminar" sponsored by NORDFORSK, originally planned to take place during the spring of 1976 was postponed to the autumn of that year, as the work-load of IDC-RITL made it impossible to allocate time and personnel.

RITL has also been involved in numerous other educational activities aimed at intermediaries, such as:

a) Tekniska Litteratursällskapet (TLS), the Swedish Society for Technical Documentation organized seminars, courses and workshops for its members and RITL staff have participated as teachers and lecturers on numerous occasions over the last years.

b) A seminar on "The Interactive Library - Computerized Processes in Library and Information Networks"[7] sponsored *inter alia* by UNESCO was held in Stockholm in November 1974. The program included several lectures and demonstrations by IDC-RITL staff.

c) The routines and programmes developed at RITL for the INCOTERM terminal[8,9] and in particular for the off-line operations of the LIBRIS system has aroused a great interest from other libraries. The planning of courses for library staff in the use of an intelligent terminal began in spring 1976. Starting in the following autumn, such two-day courses are now regular events.

d) The RIT has more than 60 sub-departments and most of them have a library which is staffed on part time by personnel having none or very little library education. When the RIT office for internal education in 1976 asked the departments whether their library-handling staff might profit from some kind of instruction in library management, as many as 85 persons applied for such courses. RITL was asked to design a basic programme of some 20 hours, presenting a general view of the different areas of library work and services. The planning and design of the first course for about twenty participants began during the spring and summer of 1976. The first course was held in the autumn of 1976 as planned.

2.3 Students

2.3.1 Background

The importance of educating future users of research libraries has long been acknowledged. In 1944 a governmental committee on the services of the technical libraries[10] strongly recommended the introduction of formal courses in library use. Unfortunately, the effects were weak. Universities went on graduating students with little knowledge of the structure of scientific information and information services. Such graduates evidently have difficulties in making efficient use of library resources or information retrieval techniques. There are now studies available[11,12] showing that Swedish engineers devote considerable time to search for information, although very inefficiently with respect to what might be achieved. However, during the last years the interest in library user education has been growing and there is now a positive preparedness to tackle the problems on a principal as well as on a practical level. The growing literature[13] and the acceptability of doctoral programs[14] in this area are tokens of change.

2.3.2 Education of students at RITL

At RITL only the School of Mining and Metallurgy, the School of Aeronautics and to some extent the School of

Chemistry had formal courses in library use before 1973. IDC-RITL staff had however been involved in numerous educational activities directed towards different student categories for many years. The RIT departments of Electrical Power Systems Engineering, Welding Technology, Steam Engineering, Industrial Economics and Management, The RIT schools of Chemistry, Aeronautics, Mining and Metallurgy as well as departments of the University of Stockholm, The Royal Caroline Medico-Chirurgical Institute, and the Chalmers Institute of Technology were amongst those where IDC-RITL personnel had presented seminars to students or participated in various organized educational activities.

With increasing recognition of library user education, this uncoordinated state of affairs became quite unsatisfactory. In 1974 an effort was made to create a reasonably flexible, yet comprehensive programme for library user education at RIT.[15] This proposal was not implemented, but it can now be seen as a first step towards gaining acceptance in the programme committees of all the RIT schools for the need of formal training in library use, in a sequence along the lines of:

a) an introduction to RITL for 1st grade students
b) a formal course in library use and IR to 3rd and 4th grade students
c) continuation courses for doctoral students.

Priority was given to instruction in the use of library and IR-services to 3rd-4th grade students. The School of Mechanical Engineering, which is the largest one of the RIT schools, was willing to incorporate such a programme into the curriculum of the Fourth (i.e. last) year. As the resources of the library are scarce, formal courses could not be introduced for all RIT students at once, but it proved to be a good start. In 1975/76 pilot courses were given to 4th grade students of the Department of Welding Technology and to doctoral students of the School of Surveying. The course (RIT designation number D3.001) for the School of Mechanical Engineering was planned and designed on the basis of these experiences.

2.3.3 Objectives and approach: a brief account

Objectives for the design of educational systems should preferably be formulated in terms of desired terminal behaviour of the students. As an example of criteria judged to be useful in the present context, we may consider a foundation of the *educational goal: To qualify participants to make efficient use of the existing scientific and technical information.*

By operationalizing this goal, we can obtain a number of sub-goals related to the participant's expected performance. After passing this course, he should

a) have a general knowledge of existing channels of scientific and technical communication and their importance,

b) be familiar with the most important sources of primary information within his special field,

c) be able to make efficient use of the collections held by research libraries,

d) be familiar with and able to use methods and techniques for information retrieval offered by libraries and information centers, e.g. abstract journals, indexes and computerized IR services.

Our educational approach is based on the following principles:

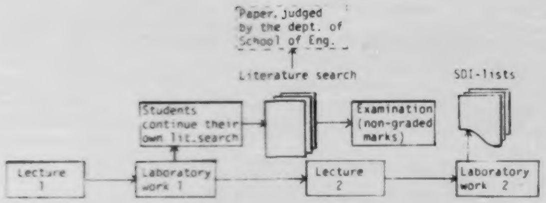
1. The educational methods should be based on "laboratory work" and personal experience rather than traditional lectures, i.e. a form of "learning by doing".

We certainly do not want to teach *library science* as an end in itself but we want to give the students tools to handle their own information needs and to develop their ability to master the literature of their own field of interest.

2. Any library instruction program must be conceived as a part of the entire educational system.

This second principle called for close contacts with the teachers of the RIT departments. Such planning and coordination efforts, which included several meetings and numerous personal contact during the spring of 1976, turned out to be extremely important for the sequel. Teachers at the different RIT departments and RITL-staff had to work out a common basic philosophy of library education. As a partial result subject-specific exercises could be prepared for the students. These would then be better motivated by involvement in an individual problem-solving situation, to accept and understand the significance of available tools for solving their present and potential information problems.

The result of the planning and design efforts was a 17 hour course[16] consisting of lectures, demonstrations, laboratory work and practical exercises (see fig. 1) to be initially presented to some 180 students during the autumn of 1976. A programme to evaluate this education [17] from various aspects was planned and carried out in cooperation with the Sociological Department of the University of Umeå.


Paper, judged
by the dept. of
School of Eng.
Literature search
SDI-lists
Students
continue their
own lit.search
Examination
(non-graded
marks)
Lecture
1
Laboratory
work 1
Lecture
2
Laboratory
work 2

No. of hours:	2 h	6 h at RITL	2 h	3 h
No of participants each time:	150-200	15	150-200	3 x 15
Contents:	Introd. lecture to scientific communication and IR	Introd. to the efficient use of RITL. Introd. to manual IR-methods and to the use of different abstracts and journals. Students begin with their own literature searches. Extensive demonstration of retrospective IR on line. (45 min for each half group of 7-8 stud.)	On comupeterized IR and the design of SDI profiles.	Construction of SDI profiles to be run free of charge for two months.
Timing:	Beginning of September.	September-October as decided with the individual departments.	End of November	End of November/ beginning of December.

Fig. 1. Educational system of course D3.001 at RIT (1976)

2.3.4 Other educational activities

RITL is also involved in other educational activities not directly related to library use and information search problems. For example the interaction of science and society gives rise to numerous problems of which also the coming generation of engineers should be aware. Since 19 3 a course in "Futures Studies" for doctoral students and a course for "Generalists" (i.e. scientific-technical advisors to decision-makers) are given as co-operative ventures between RIT and the University of Stockholm.[18] Further, an increasing number of students attend the courses in "History of Ideas in Science and Engineering Arts"[19] held by Dr T. Althin, since 1966 heading the Institute for the History of Technology, which forms part of RITL and has quite important holdings of older and historical literature.

2.4 Trainees

The position of RITL as the largest center for technological information in Sweden has without doubt contributed to the present amount of involvements in the education of librarians. Formal library education is held at the College of Librarianship in Borås (BHS) and between 1973 and 1976 about 50 trainees from BHS have spent extended periods of auscultation at RITL. Since 1974 IDC-RITL staff regularly are asked to lecture in Borås on computerized information retrieval, lately also at the courses run by the Royal Library in Stockholm. Besides the trainees from the school of Librarianship in Borås, trainees from university libraries and from the libraries of industrial firms have been accepted at RITL. A considerable number of foreign visitors also come to study IDC and RITL for periods varying from a couple of days up to several weeks. During the last three years some 25 trainees and professionals from libraries and documentation centres in France, Bulgaria, Yugoslavia, Roumania, Hungary, Norway and Finland among others stayed at RITL[20] for longer periods than a one-day visit.

Since 1975/76 RITL is carrying out a project financed by the Swedish International Development Authority (SIDA) aimed at the creation of an information and documentation service in Portugal.[21,22] During 1976 information officers and systems personnel have been trained at IDC-RITL for about 20 weeks. This has been followed up by training of information officers and systems personnel by IDC-RITL staff in Portugal (in June 1977) and by further visits of the Portugese staff at RITL.

In 1977 a similar program for Tanzania, adapted to the different conditions and needs, is in a first phase of planning.

3. Educational material

To facilitate the educational activities previously mentioned, a number of educational materials had to be developed. Only some examples will be given below:

1. Decentralization of profile construction and maintenance in EPOS-VIRA called for massive documentation of various aspects of the SDI system. A series of EPOS-VIRA manuals was created, now including a manual for each data base and a general EPOS-VIRA Profiling Guide.
2. Many reports published in the series *Stockholm Papers in Library and Information Science*, published at RITL, have been useful as unique educational and instructional materials in front-line areas.
3. A 30 page leaflet including some study materials on back-ground, objectives and organization of the course in IR for mechanical engineering students was produced[23] as well as instructional material for the students' "laboratory" work and guidelines for teachers and co-instructors.
4. Illustrative four page leaflets on our SDI services ("Can you afford scanning 10 000 professional journals?") and the ESA-RECON system ("Information retrieval in dialogue with a computer") were produced mainly for marketing purposes, although they have proved to be useful as introductional materials for users of computerized IR services.
5. A large number of overhead slides have been produced for use at lectures, seminars and other presentations. A number of slides have also been prepared for use in conjunction with demonstrations of on-line literature searches.

6. In 1975 IDC-RITL were asked to produce a sequence on on-line information retrieval to be included in an educational television programme ("Modern data-technology"). Since then the sequence has been broadcast as part of other TV-programmes ("Computers on our terms").

The potential of programmed instructional materials on library use and library services has been discussed, but not yet developed into an operational stage.

4. Conclusion

The educational activities of RITL have increased considerably both in variety and scope during the last three years. The increasing use of modern IR and library management methods and the growing awareness of the importance of library user education will without doubt contribute to make education become one of RITL's major tasks in the future, apart from the obvious regular library and documentation services. The personnel and material resources of RITL are however limited. Present expectations and demands on the library greatly transcend what can reasonably be achieved within the means available. Possibly the new organization of university studies following the great educational reform presented to parliament in 1975[24] and passed in 1977 will bring about a better balance and a sounder economic basis for educational activities in the library area. One of the important implications is that the University Library will receive its funding through the University administration instead of directly from the Ministry of Education. As a consequence, library education will be considered on the same footing with all other educational programmes, and the evaluation of its utility need not be hampered by any particular administrative status of the library.

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INTRODUCING MODERN INFORMATION SERVICES TO RESEARCH AND DEVELOPMENT IN PORTUGAL

by Roland Hjerppe

Introduction

Early in 1975 discussions were started regarding a possible cooperation between Sweden and Portugal in the field of education. In these discussions there was expressed by Portugal a desire for cooperation in introducing modern methods for information services to research and development in Portugal. This proposal was routed by the Swedish International Development Agency, SIDA, (the primary cooperation agency in Sweden,) to IDC-RITL.

The ensuing cooperation project has been described in the form of proposals in[1]. This account will thus only briefly describe the outlines of the cooperation programme.

Conspectus

The cooperation programme, as agreed upon by the corresponding parties, has the objectives of introducing computerbased information retrieval services in Portugal. Two kinds of services 1) *current awareness* or Selective Dissemination of Information, SDI, and 2) *retrospective searches*, will be offered.

It was felt that any attempt at immediate implementation in Portugal of systems for the delivery of the services would be bound to flounder or even fail since the prerequisites to success were absent. The needs for information, their extent and type were unknown. The capacity to deliver the original documents, or copies of them, was inept since library collections in science and technology were dispersed and lacking up-to-date central control (essential because of the dispersion). Trained information officers were not available and an organizational and administrative structure able to offer the services was missing.

It was therefore decided to tackle all these problems in parallell. The strategy chosen was that experimental *SDI-services* based on the EPOS-VIRA-system of IDC-RITL and the bibliographic files available at IDC-RITL (being the most comprehensive in Europe) and *retrospective services* based on the ESA-RECON system would be offered to test latent needs and conditions for acceptance. These services could thus be delivered immediately, as soon as the future information officers had been appointed and trained at IDC-RITL. During the training of this future staff, an organization, responsible for the services could be defined, structured and institutionalized.

As a somewhat independent project, the production of the Portuguese union catalogue of serials, which had been done manually, and which was in the stage of computerization, was speeded up so that it should be available at least in a preliminary version at the start of the experimental services.

Organizational structure

The solution proposed, and subsequently implemented, was that the Centro de Documentaçao Científica, which has as its main responsibility the production of the national union catalogue of serials, was transformed into a Centro de Documentaçao Científica e Técnica. The new roles are given below (translated from constitution)

1. The Centro de Documentaçao Cientifica of the old Instituto de Alta Cultura has been transformed into the Centro de Documentaçao Científica e Técnica (CDCT) which is a subsidiary of the Instituto Nacional de Investigãçao Científica.

2. The CDCT has the following tasks:

    a) to support activities of scientific or technical character concerning bibliographic information and documentation, especially in the field of research and education

    b) to support the libraries and documentation centres of the Ministry of Education and Scientific Research by disseminating new techniques and promoting standardized methodology

    c) to promote the national participation in international programmes of cooperation in the field of scientific and technical information

    d) to maintain the necessary relations with foreign documentation centres, particularly in order to facilitate the acquisition of documents not available in the country

    e) to cooperate with similar institutions now existing or to be established, outside the scope of the Ministry of Education and Scientific Research

    f) to promote cooperation between libraries and documentation centres of the Ministry of Education and Scientific Research and between these and similar institutions outside the scope of the Ministry of Education and Scientific Research, with the primary purpose to facilitate the routines of exchange of documents and copies

    g) to participate in training and continued education of professionals in scientific and technical information and documentation

    h) to promote general awareness of the increasing importance of scientific and technical information for the social, economic and technical development of the country

    i) to make the scientific and technical information and documentation produced in different countries accessible to Portuguese users in research and technology

    j) to promote the international dissemination of scientific and technical information and documentation produced in Portugal

    k) to perform research and development in the field of information sciences in cooperation with the research centres of INIC

3. In carrying out the tasks indicated under 2 above, the Centre shall:

    a) offer bibliographic information services to users in research and technology and especially selective dissemination of information (SDI) and interactive retrieval

b) catalogue all periodical and serial publications received in all libraries and documentation centres of the Ministry of Education and Scientific Research. This catalogue should, whenever possible, be extended to state or private libraries and documentation centres outside the scope of the Ministry of Education and Scientific Research

c) catalogue all production of scientific and technical documentation carried out within the scope of the Ministry of Education and Scientific Research

d) catalogue, for the purpose of bibliographic information, national research institutions and projects

e) publish all results obtained in the cataloguing actitivities in order to make them available to those interested within the country but also for the purpose of exchange with similar national or foreign institutions

f) promote the realization of projects for modernization of methodology in the libraries and documentation centres of the Ministry of Education and Scientific Research, either in the form of technical consultation or by putting forward proposals in INIC for the financing of these projects

g) develop or promote the development of systems necessary for its activities, the regular operation of which can be carried out in institutions considered convenient

h) produce or promote the production of secondary information sources in Portugal in fields of knowledge of special interest to the country, printed as well as in machine-readable form

i) propose to INIC the acquisition, by purchase or exchange, of secondary information sources, produced abroad and necessary for the activities of the Centre

j) assure, whenever necessary, the processing of these sources in cooperation with institutions that have at their disposal convenient computational means

k) maintain contacts with international information networks considered adequate to the interests of the users of the services of the Centre

l) promote the utilization of its services within and outside the scope of the Ministry of Education and Scientific Research

m) maintain a constant evaluation of the services rendered

n) promote seminars and conferences in the field of information science

o) accomplish any other tasks within mandate of the Centre pending the approval of the President of INIC

Education

In 1976 two future information officers of the CDCT were trained at the IDC during two months. The education proceeded in four areas

A) an introduction to library and information science covering scientific communication, classification and indexing, information storage and retrieval.

B) a thorough education in the EPOS-VIRA and ESA-RECON-systems and in their use.

C) discussions on the management and organization of the activities and services of IDC.

D) on-the-job training by participation in the work as an information officer, using the EPOS-VIRA and ESA-RECON-systems.

These two information officers will continue their further education in Portugal and for this as well as other obvious reasons a core collection of books and journals in library and information science was defined in cooperation and is being acquired for CDCT.

These two information officers will also give basic education to other future officers, who then will come to IDC for shorter periods for further education and "updating" on new developments. Introductory courses will be held in Portugal for research administrators, project directors and librarians.

Information services

The approach chosen for the introduction of modern information services was to rely in the beginning on external services, the IDC-RITL for *current awareness services*, and Space Documentation Service (SDS) of the European Space Agency (ESA) for *retrospective searches*. The advantages of using existing services are obvious. There is no need for implementing an indigenous system and problems associated with system implementation and identification of service needs and conditions for acceptance are avoided in the introductory phase. The range of bibliographic files and the corresponding subjects covered by the IDC-RITL and SDS-ESA could not have been matched within an independent experimental service in Portugal, which thus would have had to restrict its services to a small part of potential users.

After the initial experimental period, an attempt will be made to evaluate whether an implementation in Portugal of the EPOS-VIRA system is justifiable. It may then be decided if and in which way to proceed. Some steps preparing for this possibility have already been taken in that systems personnel have visited IDC and discussed some of the problems.

In the experimental test period the information officers trained at IDC will perform all promotional activities in Portugal as well as maintain contact with the ultimate users, do the profile design and input, and assist in original document acquisition. The mode chosen for profile input is that CDCT and IDC have acquired similar TTY-terminals with tape cassette drives. All profile information is recorded by CDCT on a cassette, which is forwarded by mail to IDC where it is mounted on the terminal for transmission to the profile handling programme EPOS. The results from the searches made each week will then be sent to Portugal by mail, first in printed form, and later, if the database producers agree, in machine-readable form for printing in Portugal and for micro-fiche production of a copy (which is filed by CDCT).

The retrospective services of ESA will be utilized in the beginning by dialling the node in France. If the acceptance and volume justify it a permanent line could be installed and perhaps a node for decentralized use in Portugal. The services of SDC and Lockheed will also be utilized but they are for the moment somewhat more expensive than ESA.

Backup services

It is obvious that an information service delivering bibliographic references cannot succeed and gain acceptance unless the original documents referred to can also be provided. The IDC has since its beginning been aware of this "trivial" fact and one of the central concerns in the cooperation with Portugal was to ensure availability of scientific and technical literature, especially journals. Preliminary surveys had shown that the collections in Portugal were small, specialized and dispersed throughout the country. Since consolidation and centralization of the collections is not feasible in the short,run the first instrument needed is a national union catalogue. Such a catalogue exists, but it has been produced manually with all accompanying delays, and it was thus not up-to-date. At the CDC a programme for computerization had been started but progress was slow, one of the problems being the large input volume. In order to speed up the production it has been suggested (and accepted) that the union catalogue should be delimited in a first phase to covering only about 100 libraries in the field of science and technology, and only holdings since 1970 (or possibly complete). In a second phase when the list from the first phase is ready, the list should be extended at least to the holdings since 1970 of around 400 libraries. In a third phase the earlier and incomplete holdings for all libraries will be added to the computer readed file. The limitations in the first phase arise from the fact that demands originating from the experimental information service will be for scientific/technical literature and only for literature produced in 1970 or later since most of the available bibliographic machine-readable files extend back to 1970 only.

The files of this union list will be produced in Portugal by CDCT and after the first phase a microfiche-version will be produced by the IDC, so that the union catalogue can be easily distributed.

Evaluation

An evaluation of the cooperation program is planned at the end of the experimental period. This evaluation will focus interest on a number of separate but interdependent functions:

1) The co-operation programme in itself, its successes and failures. The reason for this is of course the wish to learn from the past to perform better in the future.
2) The identification of the needs for and acceptance of the experimental information service as seen in relation to the promotional efforts, the status of research and development in Portugal and the capabilities and coverages of the services offered. The information gathered in this respect is critical for decisions on future efforts in Portugal.
3) The performance of services, both information retrieval and back-up from libraries. Essential are here *inter alia* an evaluation of the educational efforts within the programme and the measurement of factors like precision, timeliness, serviceability etc.[2,3]
4) Determination of the files most suitable for acquisition and processing in Portugal.
5) Determination of economic factors.
6) Assessments of value or utility of the services in terms of their impact on research and development in Portugal.

Conclusions

The programme has proceeded according to the plans. In the late fall of 1976 there has however been a delay in the introduction of the experimental service due to difficulties in staffing the reorganized CDCT.

The development of international networks such as Euronet and of interactive services, the questions of centralization vs decentralization on a national scale and of self-reliance, dependence and cooperation on an international scale are some of the uncertainties that loom ahead and that have to be faced during the coming phases of the program."

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HISTORY OF IDEAS IN SCIENCE AND ENGINEERING ARTS

by Torsten Althin

The Royal Institute of Technology Library took its rise by a wooden rubber-stamp for branding the title-page of books just acquired when the Institute was formed in 1825. Two years later this exlibris was formally accepted as the Institute's official seal and emblem. With the Royal Crown as crest and surrounded by a garland of oak leaves the emblem carries the motto: VETENSKAP OCH KONST, that is SCIENCE AND ARTS. The emblem is still daily used. The first director of the Institute, former professor of technology at the Royal Academy of Science, Gustaf Magnus Schwartz, started his work with a two years journey in Germany, Austria and France for studying education and organization at leading similar institutes. Simultaneously he purchased hundreds of books on science and technology for the new library. Thanks to preserved bills and detailed library lists one can follow how Schwartz with consequense and skill built up this library. It is noteworthy that beside current literature Schwartz didn't hesitate to obtain important books also from the 18th century, today rare books of considerable value. However, the Institute's Board of Directors seriously criticized him for spending too much money on books (critique which Schwartz more or less ignored). Actually, now we ought to be grateful for his behavior.

Schwartz left his directorship in 1845. The next important step in the history of the Library was taken only at the end of the 1860s. The higher education at Bergsskolan in Falun (School of mining and metallurgy) founded in 1819 was incorporated as a department of the Institute in Stockholm. At the same time the School's library, which mainly covered literature on mining, metallurgy and iron and steel production, became amalgamated with the Institute's collection. In this way the total number of book-titles grew to about 17 000. The Library was enriched by many significant books from the 16th century and onwards. Consequently, one can state that the collection of books, periodicals and serials nowadays covers a span of time of more than 400 years of printed matter on technology and engineering and also on the basic sciences. This means that the library constitutes an invaluable source for scholarly studies of the history of science, engineering and industry.

Since 1966 I am engaged to lecture in the history of technology at the Institute and I have the privilege to dispose an office room in the Library building, just in the real centre of accumulated literary works. This is indeed most inspiring for research and studies necessary both for preparing lectures and courses and for writing books and articles dealing with the history of technology. I really would prefer to name the subject *the history of ideas in science and engineering arts* which corresponds very well to the motto chosen 150 years ago for the Library's *Exlibris* and the Institute's emblem.

Annualy two kinds of courses are offered. The basic one (14 h.) is compulsary on all students enroled at the Institute's School of mechanical engineering during their first semester and voluntary on all students at other schools. The aim throughout the courses is not the minutiae of the engineering and engineering advances. It is rather to give the students a prospect on important engineering ideas in the past which have contributed to shape our industrial civilization, as well as to give the students background and motive for work at their *Alma Mater*. Compared to ten years ago, the interest in the subject has increased markedly. The lectures are now attended by 250-275 students. The second series of lectures (18 h.) in seminary form is mainly given for a group of students in their third or fourth year to supervise them in research within the subject and to give them insight into documentation in archives and libraries. A prominent source of documents is the Library's own collection of old books and of current publications on the history of science, technology, and engineering.

On certain conditions students may choose a theme in the history of technology and industry for their graduation paper. For example, a group of four students at the School of chemical engineering have made an extensive study (300 p.) on the dynamics of Swedish organic chemical industry from the beginnings to recent years. In a condensed form this treatise has been published by Ingenjörsförlaget, Stockholm.

Beside the activities mentioned the following ought to be added. A student working as assistant at the Institute for the history of technology, is collecting and studying hitherto almost unknown documents and engineering drawings dating from the early 18th century. They are related to Mårten Triewald (1691-1747), who constructed and in 1728 erected a Newcomen atmospheric steam engine for pumping at the Dannemora iron ore mines. A book under preparation and planned to be issued in 1977/78 will give an extensive and well illustrated account of the remarkable life and work of Triewald. This treatise will give a better picture of difficulties and the solutions that result when new ideas and discoveries in natural sciences are combined with new technological ideas and inventions. Such understanding is in fact the aim of the history of technology taught as an academic subject. I trust that the book on Triewald and his time will have much to offer engineers and industrialists of our days.

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Schwarz, S., Apokalyps och karisma: Tankar kring boken Tillväxtens gränser och fenomenet Romklubben (i Å. Sparring, S. Schwarz och B.A. Vedin (red.): *Än se'n då - diskussioner om framtidsstudier*, Stockholm 1974 [Apocalypse and charisma: thoughts round the book The borders of growth and the Club of Rome phenomene (in Å. Sparring, S. Schwarz and B.A. Vedin (eds.): And so what - and what next? Discussion on futures studies, Stockholm 1974)]. (S)

Förteckning över KTHB:s tidskrifter på vinden och i Bålsta 1974. Red: Ola Palmaer [List of RITL periodicals stored in the library attic and in Bålsta 1974. Ed: Ola Palmaer]. (S)

Förteckning över löpande tidskrifter vid KTHB. Red: Ola Palmaer [List of periodicals at the RITL. Ed: Ola Palmaer].

The interactive library: computerized processes in library and information networks. Ed: S. Schwarz (Stockholm 1975).

ISSN- och kodlista. List tech 1974 uppställd efter ISSN-nummer och koder. Red: Ola Palmaer [ISSN- and code list. List tech 1974 arranged by ISSN-numbers and codes. Ed: Ola Palmaer]. (S)

ISSN- och kodlista. List tech 1975/76 uppställd efter ISSN-nummer och koder. Red: Ola Palmaer [ISSN- and code list. List tech 1975/76 arranged by ISSN-numbers and codes. Ed: Ola Palmaer]. Report TRITA-LIB-2005, Aug 1976, 127 p. (S)

Knowledge and concepts in futures studies. Ed: S. Schwarz (Boulder, Col., 1976).

Kunskaps- och begreppsproblem i framtidsstudier, Stockholm 1975. Red: S. Schwarz [Knowledge and concept problems in futures studies (Stockholm 1975). Ed: S. Schwarz]. (S)

List tech 1974. Red: Ola Palmaer [List tech 1974. Ed: Ola Palmaer]. (S)

List tech 1975/76. Red: Ola Palmaer [List tech 1975/76. Ed: Ola Palmaer]. (S)

Än se'n då - diskussioner om framtidsstudier, Stockholm 1974. Red: S. Schwarz, Å. Sparring och B.A. Vedin [And so what - and what next? Discussions on futures studies, Stockholm 1974. Eds: S. Schwarz, Å. Sparring and B.A. Vedin]. (S)

II JOURNAL ARTICLES DEALING WITH RITL

Journal articles about the RIT library.

Christiernin, G., *För Er som inte hinner läsa facktidskrifter: pröva datorbaserad informationssökning* [For you who don´t have time to read professional literature: try computerized information retrieval].
Modern Elektronik, 1974:15, p. 30-32. (S)

Dahlström-Ekbohm, Y., *Seminarium på KTH om uppringbar nod i ESA-RECON-systemet* [Seminar at the RIT on dial-up facility to the ESA-RECON system].
Tidskrift för Dokumentation, *31*(1975)87-91. (S)

Hermanson-Snickars, F., *Kärnkraftteknikens informationskällor* [Information sources of nuclear technology].
Reaktorn, *19*(1975):1, Mar. (S)

Herzog, R.E., *Tapping the world's storehouse of technical information.*
Machine Design, *46*(1974)102-104.

Håkansson, B., *Datorn gör det lättare att hitta i litteraturen* [The computer simplifies the information retrieval].
Ny teknik, 1974:10 p. 6. (S)

Jullander, I., STFI & Hedman, T., KTH, *Nya möjligheter att söka litteratur inom det skogsindustriella området* [New ways of information retrieval within the field of forestry].
STFI kontakt, 1975:1(29). (S)

Dialog med dator - SDI-systemet servar [In dialogue with the computer - services from the SDI system].
Kemisk tidskrift, *87*(1975):7/8, p. 56. (S)

Litteratursökning med dator [Computerized information retrieval].
Lunds universitet meddelar *6*(1973):13. (S)

III VISITORS

Foreign visitors to the RIT library, for each country alphabetically listed by visitor's surname. The department visited is indicated in the following way:

(A) Acquisition dept
(C) Cataloguing dept
(I) Information and Documentation Center (IDC)
(L) Lending dept
(T) Technical service

AUSTRALIA

David Barron
National Library
May 29-30, 1975 (I)

John A. Gillam
Capitol Territory Dept.
Management Information Service
Canberra
Feb 5, 1974 (C,I)

Jessie Harley
Swinburne College of Technology
Hawtorn, Victoria
July 22-24, 1975 (C,I)

Cynthia M. James
The Australian National Univ.
Canberra
Sep 6, 1973 (C,I)

Kenneth Myer
The Myer Emporium Ltd.
Library Council
Melbourne
Jan 22,30 1974 (C,I)

T.D. Sprod
University of Tasmania
Hobart, Tasmania
Aug 3, 1973 (I)

Members of Parliament from
Australia, 8 persons
July 13, 1973 (I)

AUSTRIA

Helmut Felber
Österreichisches Normungsinstitut
Wien
Oct 29, 1975 (I)

BELGIUM

Irène Clemens-Zeltsman
Centre National de Documentation, Scientifique et Technique, Bibliothèque Royal Albert 1er
Brussels
June 28, 1976 (I)

BULGARIA

B. Boytchev,
G. Korovski &
D. Penchev
Central Institute for Scientific and Technical Information
Sofia
Sep 9,12-13, 1974 (I)

Boycho Kavaldjiev
Central Institute for Scientific and Technical Information
Sofia
June 8-10, 1976 (C,I)

D. Yordonova
Scientific centre for foreign trade
Sofia
May 21, 1975 (I)

CANADA

R.M. Duchesne &
B. Wickens
Research and Planning Branch
National Library
Ottawa
Sep 11, 1973 (C)

Arthur Fitz Patrick
Research Council of Alberta
Edmonton, Alberta
Aug 7,14, 1974 (C,I)

DENMARK

Hanne Alvi
Atomenergikommissionen
[Atomic Energy Commission]
Risø
Oct 23, 1975 (C,I)

Vibeke Amundsen &
Helge Skov
Danmarks Tekniske Bibliotek
[National Technological libr. of Denmark]
Copenhagen
Oct 16, 1975 (I)

Karen Lunde Christensen
Bibliotekscentralen
Ballerup
Sep 17, 1975 (C)

Eva Pedersen
Atomenergikommissionen
[Atomic Energy Commission]
Risø
June 28-29, 1976

Kjell Prehn
Danmarks Tekniske Bibliotek
[National Technological Libr. of Denmark]
Copenhagen
Nov 27, 1974

Ulla Retlev
Univ.bibl., 2:a avd. [Univ. libr. 2nd Dept. Scientific and medical libr.]
Copenhagen
Dec 2, 1975 (I)

Visitors from *Atomic Energy Commission Library*
Risø
(L)

FINLAND

Arja Riitta Haarala
Bibl., Tekn. Högsk. i Helsingfors
[Helsinki univ. of techn. libr.]
Jan 15, 1975 (I)

Teodora Oker-Blom
Medicinska centralbiblioteket
[Central medical library]
Helsinki
Jan 11, 1974 (C)

Kyllikki Roukonen
Finska handelshögskolan i Helsingfors, bibl. [The Helsinki School of Economics Library]
Aug 18, 1975 (C,I)

Antti Soini
Tekniska högskolans bibliotek
[The inst. of technology libr.]
Mar 12, 1976 (C)

Elin Törnudd
Bibl., Tekn. Högsk. i Helsingfors
[Helsinki univ. of techn. libr.]
Nov 27, 1974

Tua Zilliacus
Tekniska högskolan i Helsingfors
[Helsinki univ. of technology]
Apr 28, 1976

Samfundet för litteraturtjänst i Finland [The association for literature services in Finland]
30 persons
Mar 1, 1974 (C)

FRANCE

DeLorme
Université de Technologie de Compieigne
Sep 17, 1974 (I)

Detemple
CNRS
Paris
June 28-29, 1976

Yvette Henry
CNRS
Paris
Dec 16-20, 1975 (I)

Noëlle de Mamantoff
CNRS
Paris
June 28-29, 1976

Jacqueline Mirabel
CNRS
Paris
Sep 4, 1973 (I)

G. Rivière
Association franco-suèdoise pour la Recherche
Stockholm
Sep 11, 1973 (I)

W. Rybachenkow
UNESCO
Paris
Apr 19, 1974 (I)

Association nationale de la recherche technique (ANRT)
15 persons
Paris
Sep 12, 1973 (C)

GERMAN DEMOCRATIC REPUBLIC

H. Rauschenbach
VEB Verlag Technik
Berlin
Sep 11, 1974 (A)

Sigfried Seeliger
VEB
Berlin
(C)

Paul Weiss
Inst. for Scientific Information in Medicine
Berlin
Oct 16, 1975 (I)

GERMANY, FEDERAL RUPUBLIC OF

Wolf-Rüdiger Ritter
Verlag Dokumentation
Weinheim
Mar 10, 1976 (A)

Eberhard Sauppe
TIB
Hannover
June 28-29, 1976

GREAT BRITAIN

Ian Baker
British Council
London
Dec 4, 1973 (C)

Ms Bauer
BLLD
Boston Spa
Nov 11, 1974 (I)

R.E. Coward
British Library
Mar 2, 1976 (C)

John Davies
British Council
London
Nov 29, 1974 (I)

Mr Hampton &
Mr Gershon
Civil Service Dept. &
Mr Mitchell
Inland Revenue
London
Sep 19, 1973 (C)

A. J. Harley
U.K. Medlars Service, BLLD
Boston Spa
Mar 19, 1974 (I)

R. Jankovic
Butterworth & Co. Ltd.
Sevenoaks, Kent
Jan 29, 1975 (A)

David Martin
INSPEC
London
Feb 13-14, 1975 (I)

Gerald J. Sard
Collendean Farm
Norwood Hill, Horley
Jan 27, 1975 (I)

Michael Sim
ISI
Uxbridge
Oct 17, 1974, Apr 29, 1976 (I)

Tim Smartt
University Microfilms Ltd.
High Wycombe, Buckinghamshire
Mar 9, 1976 (A)

D.H. Spencer &
Simon Francis
British Embassy
Stockholm
Mar 19, 1974 (I)

Brian Vickery &
A. Vickery
University College of London
Mar 30, 1976 (C,I)

Wood
BLLD
Boston Spa
Nov 11, 1974, June 28-29, 1976 (I)

Ami Ziv
Embassy of Israel
London
Jan 31, 1974 (I)

HUNGARY

Thomas Budai
Hungarian Radio, Dept. of Documentation
Budapest
Sep 17, 1975 (C,I)

Zsuzsa Lévai
Hungarian Central Technical Libr. and Documentation Centre
Budapest
Oct 18-19, 1973 (I)

Peter Sárdy
Library Department
Ministry of Culture
Budapest
Sep 16-17, 1974 (I)

Erwin Schiff &
Imre Radvanyi
Hungarian Central Technical Libr. and Documentation Centre
Budapest
Oct 18-19, 1973 (I)

E. Szücs &
J. Grad
Hungarian institute for building science
Budapest
May 22, 1975 (I)

ICELAND

Jon Erlendsson
Office of Management Services
Reykjavik
May 7, 1976 (I)

IRELAND

C.A.H. Ashcroft
Queens University
Belfast
Mar 25-26,29 1976 (C,I)

W.F.C. Purser
System Dynamics Limited
Dublin
Oct 2, 1975 (I)

ISRAEL

Suzy Liebermann
Elyachar
Central Library, Technion - Israel Inst. of Technology
Technion City, Haifa
Aug 25, 1975 (I)

ITALY

D.M. Audsley
ESRIN SDS
Frascati
Jan 9, 1974, June 9, 1976 (I)

J. Ball
ESRO
Frascati
Aug 7, 1974 (C)

Jean-Raoul Bourgignon
ESRIN SDS
Frascati
June 13-14, 1974 (I)

Hans Evers
ESRO SDS
Frascati
July 23-24, 1974 (I)

D.I. Raitt
ESRIN SDS
Frascati
June 24, 1974 (I)

Jack Wright
ESRO
Frascati
June 24, 1974 (C)

JAPAN

Kiko Hatakeyama
Hitachi Ltd.
Tokyo
Apr 22, 1974 (I)

Tetsuro Sakamoto &
Kazumasa Yokota
Kinokuniya Book-store
Tokyo
Apr 22, 1974 (I)

KOREA

Chong Hwae Kim
Technical Library, Agency for Defence Development
Seoul
Dec 3, 1974 (C,I)

MEXICO

Gilberto Diaz Santana
Servicion Nacional ARMO
Centro de Informacion y Documentation
Mar 27, 1975 (I)

MONACO

Cécile Thiéry
Association Européenne Océanique, "Eurocean"
Feb 26, 1975 (I)

NETHERLANDS

D. van Bergeijk
ITC
Delft
June 28-29, 1976

Gysbert Bruyn
Bibliotheek der Technische Hogeschool
Delft
Aug 13, 1973 (A,C)

E. Haas
Min. v. O. & E.
Education et sciences
The Hague
June 28-29, 1976

Koos Hogendonk
Shell International Petroleum Co.
The Hague
Oct 17, 1974 (C,I)

Rudy Houtison
EBSCO Subscription Services - Europe
Nieuwveen
June 23, 1976 (A)

I. Kneppers &
D. Stephens
Richard Abel & Co.
Amsterdam
Sep 18, 1973 (A)

F.L. Polak
European Translation Center
Delft
Oct 16, 1973 (C)

M. Risseeuw
ITC
Delft
June 28-29, 1976

J.A. Traksel
Dekker & Nordemann/van Stockum
Amsterdam
Jan 21, Aug 26, 1975; Mar 23, 1976 (A)

J. Zandvliet
Library of the Technological University Delft
June 28-29, 1976

NORWAY

Sigrid Follestad Kulvik
Universitetet i Trondheim, bibl.
[University of Trondheim, libr.]
Oct 15,30, 1973 (C,I)

W. Gedde-Dahl
Plenum Press
Oslo
Jan 28, 1974 (A)

B. Hesstvedt &
T. Meisingset
Universitetet i Tromsö, bibl.
[University of Tromsö, libr.]
May 21, 1976 (I)

W. Holst
Norsk Senter for Informatikk
[Norwegian Centre for Informatics]
Oslo
June 28-29, 1976

Mette Johnsen
Norsk Senter for Informatikk
[Norwegian Centre for Informatics]
Oslo
Dec 12-18, 1973 (C,I)

Maureen Kvebekk
Universitetet i Trondheim, bibl.
[University of Trondheim, libr.]
May 21, 1976 (I)

Astrid Marstrander
Norges teknisk-naturvitenskapelige forskningsråd [Royal norwegian council for scientific and industrial research]
Oslo
Dec 18-20, 1973 (C,I)

A. Skjeltorp,
A. Rinman &
O. Krest
Forsvarets Bygningstjenste
Oslo
Feb 28, 1975 (I)

Knut Thalberg
Norges tekniska högskola
[Norwegian Institute of Technology]
Trondheim
Feb 26, Nov 27, 1974 (I)

POLAND

Jerzy Adamiuk
The Polish Institute
Stockholm
Jan 14, 1976 (I)

Florian Atkonis &
Konrad R. Fialkowski
The Institute for Scientific, Technical and Economic Information
Warszawa
Jan 14, 1976 (I)

Ludwik Jerzy Baworowski
Technical University of Wroclaw Forecasting Research Center
Wroclaw
Jan 31, 1976 (I)

PORTUGAL

L. Braga,
Minho University
Braga
Mar 25, 1976 (I)

Fernando Braganca Gil
Faculdade de ciencias &
L. Fraser Monteiro
Ministry of Education
Lisboa
Mar 9, 1976 (C)

C. Pulido
Instituto de alta cultura
Complexo interdisciplinar
Instituto superior tecnico
Nov 24, 1975; May 8-14, 1976
(I)

A.M. Mendes dos Santos
Centro de calculo das Universidades de Lisboa
Apr 19 - May 6, 1976 (I)

Amilcar Sernadas
Ministry of education, DGES
Nov 24, 1975; Mar 14 - May 15,
1976 (I)

Gabriela da Silva
Instituto de alta cultura
Complexo interdisciplinar
Instituto superior tecnico
Mar 15 - May 14, 1976 (I)

ROMANIA

Gabriel Pleséa
European Centre for Higher Education, UNESCO
Bucharest
May 6-10, 1974 (C,I)

SOMALIA

Scerif Awes Nur
Ministry of Industry
Apr 28, 1976 (C,I)

SOVIET UNION

Aleksander Lebedev
Ministry of higher education in the USSR
Moscow
Dec 3, 1975 (I)

SPAIN

Toshio Ito
Fujitsu Limited
Avda, de Brasil
Madrid
Oct 19, 1975 (I)

J. Juretschke
Centre de Informacion y Documentacion
Patronata Juan de la Cierva
Madrid
June 28-29, 1976

Josi Antonio Ramirez-Sarlester
Centre de Informacion y Documentacion
Patronata Juan de la Cierva
Madrid
June 28-29, 1976

SWITZERLAND

J.P. Sydler
Bibliothek der Eidgenössischen
Technische Hochschule
Zürich
June 28-29, 1976

TURKEY

Ulker Haxnedar
Scientific & Technical Research
Council of Turkey (OECD)
Ankara
Oct 23, 1973 (C,I)

A. Aydin Turelli
TURDOK, TBTAK
Ankara
Apr 28, 1975 (I)

USA

Richard R. Daly
Paley Library, Temple Univ.
Philadelphia
June 6, 1974 (I)

Ester Greenberg
Freiberger Library
Case Western Reserve Univ.
Cleveland, Ohio
May 10, 1974

Viktor E. Hampel
Lawrence Livermore Laboratory
Univ. of California
Livermore, California
July 29, 1973 (I)

Manfred Kochen
University of Michigan
Ann Arbor, Michigan
May 14-17, 1976 (C)

Harold A. Linstone
Futures Research Institute
Portland State Univ.
Portland, Oregon
Apr 6, 1976

E. Mortensson
Scanpresence
Jan 21, 1976 (I)

Ian Rendall
The Baker & Taylor Companies
New Jersey
Jan 12, 1976 (A)

B. Stadelman
Microforms international marketing corporation
Maxwell scientific international
Sep 11, 1974 (A)

Melvin J. Voigt
University of California
San Diego Campus, La Jolla
California
Feb 19, 1975 (C,I)

YUGOSLAVIA

Vera Levovnik
Iskra
Ljubljana
July 10-13, 1973 (I)

B.K. Verma
Zagreb
Aug 30, 1974 (I)

SWEDISH VISITORS

Besides the above listed foreign visitors the RIT library has received a large number of guests from other Swedish libraries, institutions and companies.

TRAINEES

During the period covered by this triennial report, the RIT library has also undertaken practical training of numerous participants in various external courses.

IV CONFERENCES AND JOURNEYS

IV:1 PARTICIPATION IN CONFERENCES, SEMINARS, MEETINGS AND COURSES

Conferences, seminars, meetings and courses attended by staff members of the RIT library, for each country chronologically listed.

AUSTRIA

INIS/AGRIS tape user meeting
Wien
L-B. Pettersson
May 24-26, 1976

CANADA

International congress of logic, methodology and philosophy of science
London, Ontario
S. Schwarz
Aug 27 - Sep 2, 1975

DENMARK

The 3rd Nordic I&D conference
Copenhagen
T. Hedman
June 9-11, 1976

FINLAND

"Bytesverksamhet och bytespolitik"
["Exchange activities and exchange policy"]
Hanaholmen, Helsinki
S. Schwarz
Sep 29-30, 1975

SDC user meeting
Helsinki
L. Kaiserfeld
Nov 24, 1975

NORDDOK project 22, meeting
Helsinki
S. Schwarz   G. Carlsson
Feb 24, 1976 June 3, 1976

FRANCE

International symposium on information systems and services in ongoing research in science, UNESCO
Paris
S. Schwarz
Oct 26-29, 1975

PASCAL tape workshop
Paris
E. Agerberg, M. Edström, R. Hjerppe
May 24-26, 1976

GERMANY, FEDERAL REPUBLIC OF

Meeting with CAS representatives
Frankfurt
M. Edström
Sep 27, 1974

Meeting with representatives for CAS and European licencees concerning contracts
Seeheim
R. Hjerppe
July 11, 1975

GREAT BRITAIN

Science policy foundation: fourth international symposium
London
S. Schwarz
Oct 25-26, 1973

Second INSPEC tape services workshop
Fifth Cranfield international conference on mechanized storage and retrieval system
London/Cranfield
M. Edström
July 21-25, 1975

ITALY

IVth World conference on futures research
Rome
S. Schwarz
Sep 25-30, 1973

ESRO tutorial seminar for RECON-users
Frascati
M. Edström, Z. Gluchowicz
Sep 12-14, 1973

ESA user meeting
Frascati
R. Hjerppe
Sep 18-20, 1974

ESA RECON user seminar
Frascati
Z. Gluchowicz, Å. Nord
May 12-14, 1975

RECON user seminar - 4
ESRIN
Frascati
R. Hjerppe, Å. Nord
May 20-21, 1976

LUXEMBOURG

*EUSIDIC **full** member's meeting,* and *Second European congress on information systems and networks*
Luxembourg
Z. Gluchowicz
May 27-30, 1975

NETHERLANDS

*EUSIDIC **full** member's meeting*
Amsterdam
Z. Gluchowicz
Jan 28, 1975

NORWAY

Norrønakonferensen
Stavanger
S. Schwarz
Apr 19-20, 1974

European Translations Centre 13th meeting of the Board of management
Oslo
O. Palmaer
June 28, 1974

NORDFORSK, Evaluation of information retrieval systems and functions
Oslo
R. Hjerppe
Nov 21-22, 1974

EUSIDIC full member meeting. Meeting and conference
Oslo
R. Hjerppe, S. Schwarz (conference)
Dec 2-3, 1975

POLAND

The first national conference on selective dissemination of information in the National information system
Polanica Zdroj
L. Kaiserfeld
Sep 10-13, 1974

SWEDEN

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
Skepparholmen
R. Hjerppe
Aug 20-24, 1973

Ingeniörsvetenskapsakademien
[The Swedish academy of engineering sciences]
commemoration meeting
Stockholm
T. Hedman
Oct 24, 1973

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
autumn meeting
Stockholm
Nov 5-6, 1973

Lecture in information science
University of Umeå
R. Hjerppe
Nov 16, 1973

Course I in ASSEMBLER
IBM, Stockholm
L-B. Pettersson
Nov 15-23, 1973

Seminar on GOLEM software, SIEMENS
Stockholm
M. Edström, Z. Gluchowicz, R. Hjerppe, L-B. Pettersson
Apr 18, 1974

Course II in ASSEMBLER
IBM, Stockholm
L-B. Pettersson
May 27-31, 1974

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
annual meeting
Umeå
June 12-13, 1974

International federation for information processing, Stockholm meeting and fair
Stockholm
Aug 5-10, 1974

Seminar on library techniques and innovations
American Center Library, Stockholm
A. Dahlström, G. Fröberg, O. Palmaer
Oct 1, 1974

Stockholm technical fair
Stockholm
Oct 17-23, 1974

Ingenjörsvetenskapsakademien
[The Swedish academy of engineering sciences]
commemoration meeting
Stockholm
T. Hedman
Oct 24, 1974

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
autumn meeting
Stockholm
Oct 28-29, 1974

Course in public administration
Gamla Riksdagshuset, Stockholm
O. Palmaer
Oct, 1974

Seminar on "Spridning av information till industri och forskning medelst nätverk etc." ["Dissemination of information to industry and research with the aid of networks etc."]
Fribergs herrgård
R. Hjerppe
Nov 11-13, 1974

UNESCO seminar, the Interactive library
Stockholm
M. Edström, Z. Gluchowicz, R. Hjerppe
Nov 25-28, 1974

Sveriges Mekanförbund [The Swedish association for metal transforming, mechanical and electro-mechanical engineering industries]
conference
Stockholm
Z. Gluchowicz, P. Sabsay
Dec 5, 1974

Course in cellulose technology
Stockholm
T. Hedman
Jan, 1975

IBM course
Stockholm
E. Agerberg
Mar 3, 1975

Symposium on communication technology, arranged by LM Ericsson
Vaxholm
S. Schwarz
Apr 10-11, 1975

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
annual meeting
Borås
June 3-4, 1975

IBM course
Stockholm
E. Agerberg
June 16-19, 1975

SDC Sales meeting
Stockholm
Z. Gluchowicz, R. Hjerppe, M. Wallin, K. Wessgren
Aug 6, 1975

Seminar arranged by Tekniska litteratursällskapet [The Swedish society for technical documentation]
Skepparholmen
M. Wallin
Sep 15-16,1975

Sveriges Mekanförbund [The Swedish association of metal transforming, mechanical and electromechanical engineering industries]
Stockholm
T. Hedman, L. Kaiserfeld, P. Sabsay
Sep 24, 1975

Ingeniörsvetenskapsakademien
[The Swedish academy of engineering sciences]
commemoration meeting
Stockholm
T. Hedman
Oct 24, 1975

Conference on classification for communication and inference
Stockholm
A. Dahlström
Oct 28, 1975

Conference on education of library users
Gothenburg
P. Sabsay, S. Schwarz
Nov 4-5, 1975

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
autumn meeting
Stockholm
Nov 10-11, 1975

Conference Mikro 75
Stockholm
G. Carlsson, T. Hedman
Nov 27-28, 1975

SDC Sales meeting
Stockholm
M. Edström, L. Kanafarski
Nov 28, 1975

Course in labour management
Hooks herrgård
O. Palmaer
Nov, 1975

SDC Workshop
Stockholm
L. Kaiserfeld
Dec 1-2, 1975

Incoterm systems course
Växjö-data, Stockholm
S. Svanström
Dec 1-5, 1975

Operating information, DEC-10 computer
Stockholms datamaskincentral för högre utbildning och forskning
[Stockholm computing center for higher education and research]
Stockholm
E. Agerberg
Dec 4, 1975; Jan 21, 1976

Sveriges Mekanförbund [The Swedish association for metal transforming, mechanical and electromechanical engineering industries]
Stockholm
T. Hedman
Dec 8, 1975

MIC & BOISIS seminar
Stockholm
M. Edström, L. Kaiserfeld, L. Kanafarski, K. Wessgren
Jan 22, 1976

Seminar on development of educational aids, arranged by the KIT
Lidingö
P. Sabsay
Feb 2-5, 1976

Symposium arranged by "Samarbetskommittén för långsiktsmotiverad forskning" [The cooperation committee for long term justified research]
Linköping
S. Schwarz
Feb 4-5, 1976

NORDFORSK, Hearing on SCANNET
Stockholm
R. Hjerppe
Feb 17, 1976

Svenska Bibliotekariesamfundet
[The Swedish association of librarians]
annual meeting
K. Wessgren, S. Schwarz
Örebro
Mar 7-8, 1976

IBM course, IMS/VS Information
IBM, Stockholm
L-B. Pettersson
Mar 22, 1976

MEDLINE participants meeting
MIC, Stockholm
L. Kaiserfeld
Mar 22-23, 1976

Svenska Bibliotekariesamfundet
[The Swedish association of librarians]
information
University of Stockholm
Apr 8, 1976

SDC user meeting
University of Stockholm
L. Kaiserfeld, L. Klasén, K. Wessgren
Apr 28, 1976

KVAL-seminar
Gamla riksdagshuset
Stockholm
R. Hjerppe
May 7, 1976

SDC advanced user training
University of Stockholm
L. Kaiserfeld
May 7, 1976

Tekniska litteratursällskapet
[The Swedish society for technical documentation]
spring meeting
Karlstad
May 17-18, 1976

Chemical information, Sweden-Japan foundation for research and development
Stockholm
L. Kanafarski
May 20, 1976

Svenska Bibliotekariesamfundet
[The Swedish association of librarians]
educational visit
Stockholm
K. Wessgren
June 9, 1976

Sveriges Allmänna Biblioteksförening
[The Swedish Library Association]
annual meeting
Skellefteå
S. Schwarz
June 20-21, 1976

ITC, 23rd committee meeting
Stockholm
S. Schwarz
June 28, 1976

ITC, 15th board meeting
Stockholm
S. Schwarz
June 29, 1976

SWITZERLAND

IATUL-conference
Zürich
S. Schwarz
May 26-30, 1975

USA

The ERIC data base user conference
The Ohio State University
Columbus, Ohio
Z. Gluchowicz
Oct 10-12, 1973

ASIS, American Society for Information Sciences, annual meeting
Los Angeles, California
Z. Gluchowicz, R. Hjerppe
Oct 21-25, 1973

YUGOSLAVIA

5th International conference of science and society
Dubrovnik
S. Schwarz
July 7-13, 1973

5th World futures studies conference
Dubrovnik
S. Schwarz
Mar 27 - Apr 4, 1976

IV:2 OFFICIAL JOURNEYS

Official journeys (selective list) undertaken by staff members of the RIT library on different missions, for each country chronologically listed.

CANADA

The National science library of Canada, CAN/SDI
Ottawa
Z. Gluchowicz
Oct 15, 1973

The National library of Canada
Ottawa
Z. Gluchowicz
Oct 16, 1973

University of Toronto, The Ontario educational communications authority
Toronto
S. Schwarz
Aug 24, 1975

National research council, Canadian institute for scientific and technical information
Ottawa
L-B. Pettersson, S. Schwarz
Apr, 1975 Aug 25, 1975

International development research centre
Ottawa
S. Schwarz
Aug 26, 1975

University of Western Ontario, Weldon library
London, Ontario
S. Schwarz
Aug 27 - Sep 2, 1975

FINLAND

SCANNET investigation
Helsinki
R. Hjerppe
Oct 31, 1975

GREAT BRITAIN

Science policy research unit, University of Sussex
S. Schwarz
Oct 24, 1973

NORWAY

SCANNET investigation
Trondheim
R. Hjerppe
Oct 27, 1975

SCANNET investigation
Oslo
R. Hjerppe
Nov 3, 1975

PORTUGAL

Portugal-project
Lisbon
R. Hjerppe
Feb 2-14, 1976

Instituto de alta cultura and
Ministry of education
Lisbon
S. Schwarz
Feb 11-14, 1976

SWEDEN

CTH Bibliotek [Chalmers institute of technology library]
Gothenburg
G. Fröberg
Jan 28-29, 1974

Study trip to book binding departments
CTH Bibliotek [Chalmers institute of technology library]
Göteborgs universitetsbibliotek [Gothenburg university library]
LUB [Lund university library]
O. Ahlström
May 27-31, 1974

Umeå universitetsbibliotek [Umeå university library]
Umeå
G. Fröberg
June 12-13, 1974

Panel debate on LIBRIS
Bibliotekshögskolan [The College of librarianship]
Borås
E. Sjöholm
Dec 3, 1974

Studies on handling of periodicals
Volvo library
Gothenburg
O. Palmaer
Feb, 1976

USA

The Ohio state university library, Mechanized information center
Z. Gluchowicz
Oct 12, 1973

The Illinois institute of technology, Computer search center
Chicago
Z. Gluchowicz
Oct 18, 1973

The University of Georgia, The Information Dissemination Center - IDC
Athens, Georgia
Z. Gluchowicz
Oct 19, 1973

The University of California, Lawrence Livermore laboratory, The Information research group
Livermore, California
Z. Gluchowicz, R. Hjerppe
Oct 29, 1973

Engineering Index, Inc.
New York
L-B. Pettersson
Apr or May, 1975

CCM Information corporation
New York
L-B. Pettersson
Apr or May, 1975

Institute for Scientific Information
Philadelphia
L-B. Pettersson
Apr or May, 1975

Center for information science, Lehigh University
L-B. Pettersson
Apr or May, 1975

Congressional research service, Library of Congress
Washington
L-B. Pettersson
Apr or May, 1975

Georgia Information Dissemination Center, GIDC
Athens, Georgia
L-B. Pettersson
May, 1975

Portland state university, Futures research institute
S. Schwarz
Sep 3-5, 1975

Portland state university, Library
S. Schwarz
Sep 4, 1975

University of California, General library
Berkely
S. Schwarz
Sep 8, 1975

University of California, Lawrence Berkely laboratory library
S. Schwarz
Sep 9, 1975

University of Denver, Denver research institute
S. Schwarz
Sep 10-14, 1975

University of Denver, Library
S. Schwarz
Sep 11, 1975

Ohio College library center
Columbus, Ohio
S. Schwarz
Sep 15, 1975

The Ohio state university, Department of computer and information science
Columbus, Ohio
S. Schwarz
Sep 15, 1975

The Library of Congress, MARC development office and *Congress research service*
Washington, D.C.
S. Schwarz
Sep 17, 1975

Office of technology assessment, U.S. congress
Washington, D.C.
S. Schwarz
Sep 17, 1975

V PROJECTS AND OTHER COMMITMENTS

V:1 PROJECTS

Research projects performed at the RIT library under financial support from Swedish research councils. The amount for each project refers to the *grant*, not to the total budget.

Datamaskinell dokumentationstjänst - SDI [Computerized information retrieval - Selective dissemination of information]

July 1, 1973 - June 30, 1974	983.680 SwCrs
July 1, 1974 - June 30, 1975	1.307.849 "
July 1, 1975 - June 30, 1976	1.347.836 "

Etablering av uppringbar nod till ESA-RECON-systemet [Initiation of dial-up facility to the ESA-RECON system]

Oct 1, 1975 - Dec 31, 1976	127.000 SwCrs

Interaktiv informationssökning med hjälp av höghastighetsterminal till ESA-RECON-systemet [Interactive information retrieval with the aid of a high-speed terminal to the ESA-RECON system]

Dec 1, 1973 - Dec 31, 1974	120.000 SwCrs
Jan 1, 1975 - Dec 31, 1975	364.268 "
Jan 1, 1976 - Dec 31, 1976	259.500 "

KOMPOST, ett kompakt postformat för bibliografiska data [KOMPOST, a compact record format for bibliographical data]

July 1, 1973 - June 30, 1974	61.610 SwCrs
July 1, 1974 - June 30, 1975	85.538 "

PROTECT, säkerhetsanordningar för profilhanteringssystemet EPOS [PROTECT, a security device system for EPOS]

July 1, 1974 - June 30, 1975	83.666 SwCrs

SDI för samhällsvetare [Selective dissemination of information for social scientists]

July 1, 1973 - June 30, 1974	50.000 SwCrs

3RIP. Interaktiv hantering av stora och i ringa grad formaliserade informationsmängder [3RIP. Interactive handling of large and only slightly formalized information volumes]

July 1, 1973 - Feb 28, 1974	139.955 SwCrs
Mar 1, 1974 - Dec 31, 1974	304.000 "
Jan 1, 1975 - June 30, 1975	243.756 "
July 1, 1975 - June 30, 1976	436.203 "

V:2 COMMISSIONS

Various commissions carried out by staff members of the RIT library, in part financed by external sources.

FORSKNINGSBIBLIOTEKSRÅDET [THE SWEDISH COUNCIL OF RESEARCH LIBRARIES]

Annual participation in price statistics work.
Acquisition department staff

FOA [RESEARCH INSTITUTE OF NATIONAL DEFENCE]

Participant in planning and organization of seminars on critical analysis of literature on futures studies, Stockholm 1974.
S. Schwarz

FÖRENINGEN FÖR FRAMTIDSSTUDIER [SOCIETY FOR FUTURES STUDIES]

Planning and organization of seminar "Kunskaps- och begreppsproblem i framtidsstudier" [Knowledge and concepts in futures studies], Stockholm 1974.
S. Schwarz

MILJÖDATANÄMNDEN [THE SWEDISH COUNCIL OF ENVIRONMENTAL INFORMATION]

Consultant work.
L. Kaiserfeld

RIT LIBRARY

Investigation of the requirements of some industrial libraries in Stockholm for shelf space in the Swedish governmental library depot, Varpsundet, Bålsta.
O. Palmaer

SIDA

Studies of requirements for documentation services within SAREC (Swedish agency for research cooperation with developing countries)
Dec-75 - Aug 76
M. Wallin

Swedish-Portuguese cooperation in the field of scientific and technical information and documentation.
S. Schwarz, IDC staff

STANDARDIZATION WORK

Ett entydigt system för tidskriftstitelförkortningar [An unambiguous system for abbreviations of titles of periodicals]. *Tidskrift för dokumentation 30*(1974)6. (S)
O. Palmaer

Preparation for voting on some ISO drafts.
O. Palmaer

Translation into Swedish of "ISO/DIS 9 (not yet numbered Swedish SIS-standard). Documentation - Translation of Slavic cyrillic characters."
O. Palmaer

Translation into Swedish of "SIS 03 84 01 Förkortningar av titlar i periodiska publikationer" [Abbreviations of titles in periodicals] (In cooperation with Lennart Grönberg, Stockholm school of economics).
O. Palmaer

Translation into Swedish of "SIS 03 84 02 Ordförkortningslista [World abbreviation list] (In cooperation with Lennart Grönberg, Stockholm school of economics).
O. Palmaer

TEKNISKA LITTERATURSÄLLSKAPET [THE SWEDISH SOCIETY FOR TECHNICAL DOCUMENTATION]

Contributions to "Kompendium i bibliografi, tredje omarbetade utgåvan [Compendium in bibliography, 3rd revised edition], Stockholm 1975, Tekniska litteratursällskapet. Bibliografier. 3."

1. Linders, J., Allmän och allmän teknisk bibliografi [General and general technical bibliography], p. 7-17.
2. Edström, M., Kemi [Chemistry], p. 71-82.

Organization of seminar on book binding at the Royal library, January 1976.
O. Palmaer

UNESCO

Participant in planning and organization of UNESCO-seminar "The Interactive library", Stockholm 1974.
S. Schwarz

V:3 PARTICIPATION IN COMMITTEES AND WORKING GROUPS

Committees and working groups in which staff members of the RIT library have taken active part.

EUSIDIC

Conference planning committee
R. Hjerppe

EUSIREF
R. Hjerppe

"User-supplier relationship": meeting with European licensees with CAS
R. Hjerppe

FORSKNINGSBIBLIOTEKSRÅDET [THE SWEDISH COUNCIL OF RESEARCH LIBRARIES]

Member of the council
S. Schwarz

Member of the *ADB-group*
S. Schwarz

Working group on *classification*
A. Dahlström

The committee for cooperation between FBR and FLS, on behalf of FBR
S. Schwarz

Working group on *information retrieval*
Z. Gluchowicz, R. Hjerppe, S. Schwarz

Working group on *interlibrary loans*
J. Linders

Working group *"KROG-katalogregelomläggningsgruppen"* [New rules introduction task group] former *"KRUT-katalogregelutredningen"* [Catalogue rules investigation task group]
E. Sjöholm, G. Werme

Member of the *LIBRIS management group*, on behalf of FBR
S. Schwarz

LIBRIS project
R. Hjerppe

Working group on *registration of periodicals*
R. Hjerppe, O. Palmaer

Working group on *retrieval systems*
R. Hjerppe, E. Sjöholm

Working group on *statistics*
G. Carlsson, R. Hjerppe, S. Schwarz

The Statistics group of the NFBS, on behalf of FBR
S. Schwarz

The Swedish UNISIST committee, on behalf of FBR
S. Schwarz

NORDFORSK

SCANNET project
R. Hjerppe

The council for information & documentation
R. Hjerppe

STANDARDIZATION WORK

Ad hoc group on linguistic subjects concerning SIS T 34
O. Palmaer

ISO TC 46
R. Hjerppe

ISO/INFCO
R. Hjerppe

SIS T 34.10 Micrographics
R. Hjerppe, L-B. Pettersson

TEKNISKA LITTERATURSÄLLSKAPET [THE SWEDISH SOCIETY FOR TECHNICAL DOCUMENTATION]

Committee on informatics
R. Hjerppe

Working group on *library routines and ADB*
R. Hjerppe

TLS board
T. Hedman

UDC-committee
A. Dahlström

VARIOUS

Representative for Sweden in the *"Board of management"* and in the *"Committee"* of the *International Translation Centre* in Delft
S. Schwarz

Working group for *cooperation between MIC and IDC*
R. Hjerppe

Member of the steering group for the project *"Data av intresse för långsiktsmotiverad forskning"* [Data of interest for long term justified research] performed within *"Samarbetskommittén för långsiktsmotiverad forskning"* [The cooperation committee for long term justified research]
S. Schwarz

Chairman of *Föreningen för framtidsstudier* [The Society for futures studies]
S. Schwarz

Consultative work for *Miljödatanämnden* [The Swedish council of environmental information]
M. Edström, Z. Gluchowicz, R. Hjerppe, L. Kaiserfeld

Representative for SINFDOK in a *Nordic steering group for the NORDDOK-project "Prestations-projekt"*
S. Schwarz

Scandiaplanens specialkommitté för teknik [The "Scandiaplan" special committee for technics] in Oslo
S. Schwarz

Representative for Sweden in *"Steering group on indicators for scientific and technical information"* at the *OECD* in Paris
S. Schwarz

Stockholmsbibliotekens samarbetsnämnds depå-grupp [The depot group of the cooperation committee of Stockholm libraries]
O. Palmaer

Working group for preparation of the brochure "Bokbindning. Råd och anvisningar 1973", *Utrustningsnämnden för universitet och högskolor*. ["Bookbinding. Advices and instructions 1973". Publ. by the Planning and equipment board for the Swedish universities and colleges] In Swedish.
O. Palmaer

V:4 STATEMENTS OF OPINION ON MATTERS SUBMITTED FOR CONSIDERATION

What in Swedish is called "remissyttranden", mainly concerning final reports from government committees and study groups.

BIBLIOGRAFISKA INSTITUTET [THE SWEDISH BIBLIOGRAPHICAL INSTITUTE OF THE ROYAL LIBRARY IN STOCKHOLM]

The Swedish national bibliography. Memorandum
A. Dahlström et al.
Nov 5, 1975

JUSTITIEDEPARTEMENTET [THE MINISTRY OF JUSTICE]

Teknikbedömning [Technology review]. Report
S. Schwarz
July 2, 1975

LUP-NÄMNDEN [THE LUP BOARD]

Requirements of reading and working places within the university libraries. Investigation
A. Dahlström, J. Linders & O. Palmaer
Oct 12, 1973

Storage spaces in libraries. Inquiry
S. Schwarz
Sep 22, 1975

THE NOSP SECRETARIAT

A union catalogue of serials in Nordic libraries. The NOSP project
O. Palmaer (on behalf of TLS)

STATSKONTORET [THE SWEDISH AGENCY FOR ADMINISTRATIVE DEVELOPMENT]

Datanät för dokumentationsområdet [Networks for documentation]. Report
R. Hjerppe (on behalf of FBR)

De vetenskapliga biblioteken - organisation och administration [The scientific libraries - organization and administration]. Report
S. Schwarz
June 30, 1974

UKÄ [THE OFFICE OF THE CHANCELLOR OF THE SWEDISH UNIVERSITIES]

Nordic program on futures studies. Proposal from the members in Nordiska rådet [The Nordic Council]
S. Schwarz
May 12, 1975

VI EDUCATIONAL AND PROMOTIONAL ACTIVITIES

VI:1 SEMINARS, LECTURES

Seminars, workshops and lectures organized and/or held by staff members of the RIT library.

SEMINARS, WORKSHOPS AND LECTURES ON SUBJECTS MAINLY IN THE FIELD OF INFORMATION AND DOCUMENTATION

Atlas Copco AB
Stockholm
T. Hedman
Oct 25, 1973

Biomedical Documentation Center
Stockholm
M. Edström, R. Hjerppe
May 31, 1974

Bulten-Kanthal AB
Hallstahammar
T. Hedman
Nov 28, 1973

Center for marketing techniques
Stockholm
L. Kaiserfeld, K. Wessgren
June 8, 1976

Chalmer's institute of technology
Gothenburg
M. Edström, R. Hjerppe, Å. Nord, K. Wessgren
Mar 21-22, 1974

The College of librarianship
Borås
Z. Gluchowicz, R. Hjerppe
Nov 29, 1974; May 20, Nov 17-19, 1975; May 3-5, 1976

The College of librarianship,
students
Stockholm
M. Edström
Mar 22, 1974

DEMOS project staff
Stockholm
P. Sabsay
Dec 3, 1975

FBR ADB-group
Stockholm
R. Hjerppe
Oct 9, 1975

Husqvarna Vapenfabriks AB
Huskvarna
T. Hedman
Feb 26, 1974

IVAK
Stockholm
Z. Gluchowicz, R. Hjerppe
Dec 18, 1973

The Joint group for information and documentation within the pharmaceutical industries
Stockholm
Z. Gluchowicz
Oct 17, 1974

Karlstads Mekaniska Verkstad
Karlstad
T. Hedman
May 18, 1976

Lund university
IDC staff
Sep 19, 1973

MEDLINE course, lecture
Stockholm
R. Hjerppe
Oct 13, 1975

Munksjö AB
Jönköping
T. Hedman
Feb 27, 1974

The National association of Swedish chemists
Gothenburg
R. Hjerppe
Nov 27, 1975

The National Swedish institute for building research
Stockholm
Z. Gluchowicz
Apr 3, 1975

The National telecommunication administration library
Stockholm
R. Hjerppe, Å. Nord
Mar 25, 1974

Norwegian institute of technology
Trondheim, NORWAY
L. Kaiserfeld
July 8-9, 1974

The Research institute of the Swedish national defense
Stockholm
W. Hemborg, R. Hjerppe, P. Sabsay
May 15, Oct 1, 1975; Jan 16, 1976

RIT administrative department
Stockholm
M. Edström
Jan 28, 1976

RIT Dept. of aeronautics
T. Hedman
Jan 31, 1974; Jan 31, Feb 7, 1975; Jan 26, 1976

RIT, Dept. of cellulose technology
T. Hedman
Feb 20, 1975

RIT, Dept. of electric power systems
M. Edström, Å. Nord
Nov 12-13, 1974

RIT, Dept. of electrical measurements
R. Hjerppe, Å. Nord
Mar 28, May 7, 1974

RIT, Dept. of industrial economics and management
R. Hjerppe
Oct 6,8, 1975

RIT, Dept. of machine elements
T. Hedman
Sep 18, 1973; Sep 10, 1975

RIT, Dept. of machine tools
T. Hedman
Jan 23, 1975

RIT, Dept. of mechanical engineering
T. Hedman
Sep 27, 1974

RIT, Dept. of mechanical engineering of Wood
T. Hedman
Jan 13, 1975

RIT, Dept. of mineral processing
T. Hedman
Sep 24, 1974

RIT, Dept. of plasma physics
T. Hedman, L. Kaiserfeld
Dec 3, 1974

RIT, Dept. of steam engineering
T. Hedman, R. Hjerppe, P. Sabsay
Sep 25, 1974; Sep 11, 1975

RIT, Dept. of welding technology
L. Klasén, P. Sabsay
Sep 17,19, 1975; Mar 3, 1976

RIT, EPOS/VIRA data base handbooks, seminar
IDC staff
Mar 11-12, 1976

RIT, RECON dial-up seminar
IDC staff
Feb 13, 1976

RIT, School of chemical engineering, candidates
M. Edström, L. Kaiserfeld,
L. Kanafarski, K. Wessgren
Apr 3, 1975

RIT, School of electrical engineering
Å. Nord
Oct 9, 1975

RIT, School of mining and metallurgy; materials testing
T. Hedman
Sep 9,16,23, 1975

RIT, School of mining and metallurgy; mineral processing
T. Hedman
Sep 11, 1975

RIT, School of surveying
P. Sabsay
May 6,7,17, 1976

RIT, SDI conference
IDC staff
Feb 24, Mar 10, 1975

RIT, SDI seminar
IDC staff
Mar 17, 1975

The Royal agricultural college
Ultuna
R. Hjerppe
Apr 6, 1976

The Royal Caroline institute
Stockholm
Z. Gluchowicz, T. Hedman, Å. Nord
Mar 21, 1974; Mar 13, 1975

The Royal Caroline institute,
doctoral students
Stockholm
Å. Nord
May 6, 1976

The Royal college of forestry
Stockholm
T. Hedman
Oct 19, 1973

SINFDOK staff
Stockholm
M. Edström
Jan 28, 1976

The Society for literature service in Finland
Z. Gluchowicz
Mar 21, 1974

Stenberg-Flygt AB
Stockholm
R. Hjerppe, P. Sabsay
Sep 25, 1975

Stockholm university, Dept. of informatics
Z. Gluchowicz
Dec 6, 1973

STORA
Falun
T. Hedman, R. Hjerppe
Apr 2, 1974

The Swedish academy of engineering sciences
Stockholm
IDC staff
Apr 7, 1975

The Swedish association of engineers
Stockholm
Z. Gluchowicz, S. Schwarz
Feb 18, 1974

The Swedish association of engineers and architects
Södertälje
T. Hedman
Feb 9, 1976

The Swedish corrosion institute
Stockholm
T. Hedman
Nov 1, 1973

The Swedish defence staff
Stockholm
T. Hedman
Mar 18, 1975

The Swedish ironmasters' association
Stockholm
T. Hedman
Mar 15, 1974; Mar 13, 1975

The Swedish newsprint research center
Stockholm
T. Hedman
Nov 22, 1973

The Swedish society for technical documentation
Stockholm
T. Hedman, R. Hjerppe
Mar 3, Oct 28, 1975

Technical association
Nynäshamn
R. Hjerppe
Oct 9, 1975

Uddeholm AB
Hagfors
T. Hedman, R. Hjerppe, L. Kaiserfeld
Dec 10, 1974

Umeå university, Dept. of informatics
R. Hjerppe
Nov 6, 1973

Wroclaw, Poland, Technical university library
S. Schwarz
Jan 25-31, 1975

LECTURES ON OTHER SUBJECTS

Epistemological problems in the Delphi method for forecasting.
Lund university, Dept. for peace and conflict research.
S. Schwarz
Apr 2-3, 1974

The ideology of the Club of Rome - a critique.
International centre of methodology for futures and development studies.
Bucarest
S. Schwarz
May 16, 1974

On responsibility in planning and decision-making.
Vrije Universitet
Amsterdam
S. Schwarz
Oct 21-22, 1974

Basic pitfalls in the Anderla report.
Swedish society for technical documentation, Autumn meeting.
Stockholm
S. Schwarz
Oct 28-29, 1974

What is Libris?
Swedish society for technical documentation. West Swedish district.
Gothenburg
O. Palmaer
Nov 14, 1974

On responsibility in planning and decision-making.
Luleå university, Dept. of labour science.
S. Schwarz
Dec 5, 1974

Epistemological and ethical problems in futures studies.
Umeå university, Dept. of theory of science.
S. Schwarz
Dec 6, 1974

On responsibility in planning and decision making.
Technical university, Dept. for technical forecasting.
Wroclaw, Poland
S. Schwarz
Jan 25-31, 1975

Critical assessment of the Delphi method for forecasting.
Technical university, Dept. for technical forecasting.
Wroclaw, Poland
S. Schwarz
Jan 25-31, 1975

On the ideology of the Club of Rome - a critique.
Technical university, Dept. for technical forecasting.
Wroclaw, Poland
S. Schwarz
Jan 25-31, 1975

On advice and criticism in decision-making processes.
Technical university, Dept. for technical forecasting.
Wroclaw, Poland
S. Schwarz
Jan 25-31, 1975

On responsibility in planning and decision-making.
Lund university, Science policy research program.
S. Schwarz
Feb 6, 1975

On the functions of the interlibrary loans network.
SDI-seminar.
RIT, Stockholm
J. Linders
Mar 17, 1975

How we make List Tech.
Staff of the Grånges industry library.
Stockholm
O. Palmaer
Apr 7, 1975

Application of Swedish catalogue rules 1974. Group 3.
Swedish association of librarians course.
RIT, Stockholm
E. Sjöholm
Oct 29, 1975

"Generalist course" on media, sources of information, and the library system.
RIT, Stockholm
J. Linders
Feb 1976

Wicked problems in social forecasting.
Swedish society for town and country planning.
Stockholm
S. Schwarz
May 31, 1976

Ideology of research and professional ethics of scientists.
Stockholm university, Dept. of theoretical physics.
S. Schwarz
June 8, 1976

Lectures on technical bibliography at courses for library assistants.
RIT, Stockholm
J. Linders

VI:2 COURSES

Courses organized and performed by staff members of the RIT library.

Course for generalists, Scientific-technical advisors to decision-makers
University of Stockholm
S. Schwarz (in cooperation with T. Gerholm)
1976

Doctoral courses in futures studies
RIT and University of Stockholm
S. Schwarz (in cooperation with I. Kordi and S. Wikström)

EPOS/VIRA basic training I
RIT, Stockholm
IDC staff
May 10-14, 1976

VI:3 EXPOSITIONS

Expositions arranged in the RIT library.

Technical literature from GDR (500 titles)
May 6-8, 1974

Technical literature from GDR (200 titles)
Apr 21-22, 1975

French technical and scientific literature (320 titles)
May 10-19, 1976

VII MEMBERSHIPS

International or individual membership of scholary societies.

INTERNATIONAL SOCIETIES

American Association for the Advancement of Science, AAAS

American Nuclear Society, ANS

American Society for Information Science, ASIS

Association of Scientific Information Dissemination Centers, ASIDIC

European Association of Scientific Information Dissemination Centers, EUSIDIC

International Association of Technical University Libraries, IATUL

International Federation of Library Associations, IFLA

International Society for Technology Assessment, ISTA

Philosophy of Science Association, PSA

Science Policy Foundation, England

Society for the History of Technology

The Library and its Head Librarian are furthermore members of a large number of different international and national societies, in which membership is necessary for subscription to their publications at a lower rate.

SWEDISH SOCIETIES FOR LIBRARIANSHIP

Svenska Bibliotekariesamfundet [Swedish Association of Librarians]

Sveriges Allmänna Biblioteksförening [Swedish Library Association]

Sveriges Vetenskapliga Specialbiblioteks Förening [Swedish Association of Scientific Special Libraries]

Sällskapet för klassifikationsforskning [Swedish Society for Classification Research]

Tekniska Litteratursällskapet [Swedish Society for Technical Documentation]

VIII LIST OF ABBREVIATIONS

AR	Adaption Reference. Klassificeringssystem
ASIS	American Society for Information Science
BIOSIS	Biosciences Information Service of Biological Abstracts
BLLD	British Library, Lending Division
BMDC	Biomedicinska Informationscentralen (at Karolinska Inst.)
BS:	Arbetsgrupper inom FAG (Forskningsbiblioteksrådets ADB-grupp) med representanter för bibliotek- och systemsidan
real	Realkatalogisering
per	Periodikahantering
CNRS	Centre National de la Recherche Scientifique
COR	Centralt objektregister (LIBRIS)
DGES	Direcao Geral do Ensino Superior
EDP	Electronic Data Processing
ERIC	Educational Resources Information Center
ESA	European Space Agency
ESRIN-SDS	European Space Research Institute - Space Documentation Service
ESRO	European Space Research Organization
ETH	Eidgenössische Technische Hochschule, Zürich
EUSIDIC	European Association of Scientific Information Dissemination Centres
EUSIREF	EUSIDIC Referal Group
FBR	Forskningsbiblioteksrådet
FS	Field System. Klassificeringssystem
INSPEC	Information Services in Physics, Electrotechnology, Computers and Control
ISO	International Standardization Organisation
/DIS	Draft International Standard
/INFCO	Information Committee
/TC	Technical Committee
ISI	Institute for Scientific Information
ISSN	International Standard Serial Number
IVAK	Institutet för vidareutbildning av akademiker
KROG	Katalogregelomläggning
KVAL	Forskningsgruppen för kvantitativ lingvistik

LIBRIS	Library Information System
LUP	Kommittén för lokal- och utrustningsprogram för Stockholm
MIC	Medicinska Informationscentralen
NORDDOK	Nordiska koordineringsorganet för teknisk och naturvetenskaplig information
NORDFORSK	Nordiska koordineringsorganet för teknisk och naturvetenskaplig forskning
NOSP	Nordisk samkatalog över periodica
PASCAL	Programme Appliqué à la Sélection et à la Compilation Automatique de la Littérature
RIT	Royal Institute of Technology
RECON	Remote Console
SDC	System Development Corporation
SIDA	Swedish International Development Authority
SIS	Sveriges Standardiseringskommission
STFI	Svenska Träforskningsinstitutet
STORA	Stora Kopparbergs Bergslags AB
UDC	Universal Decimal Classification
US	Universellt system (decimalsystem)
UNESCO	United Nations' Educational, Scientific and Cultural Organization
VEB	Volkseigene Betrieb